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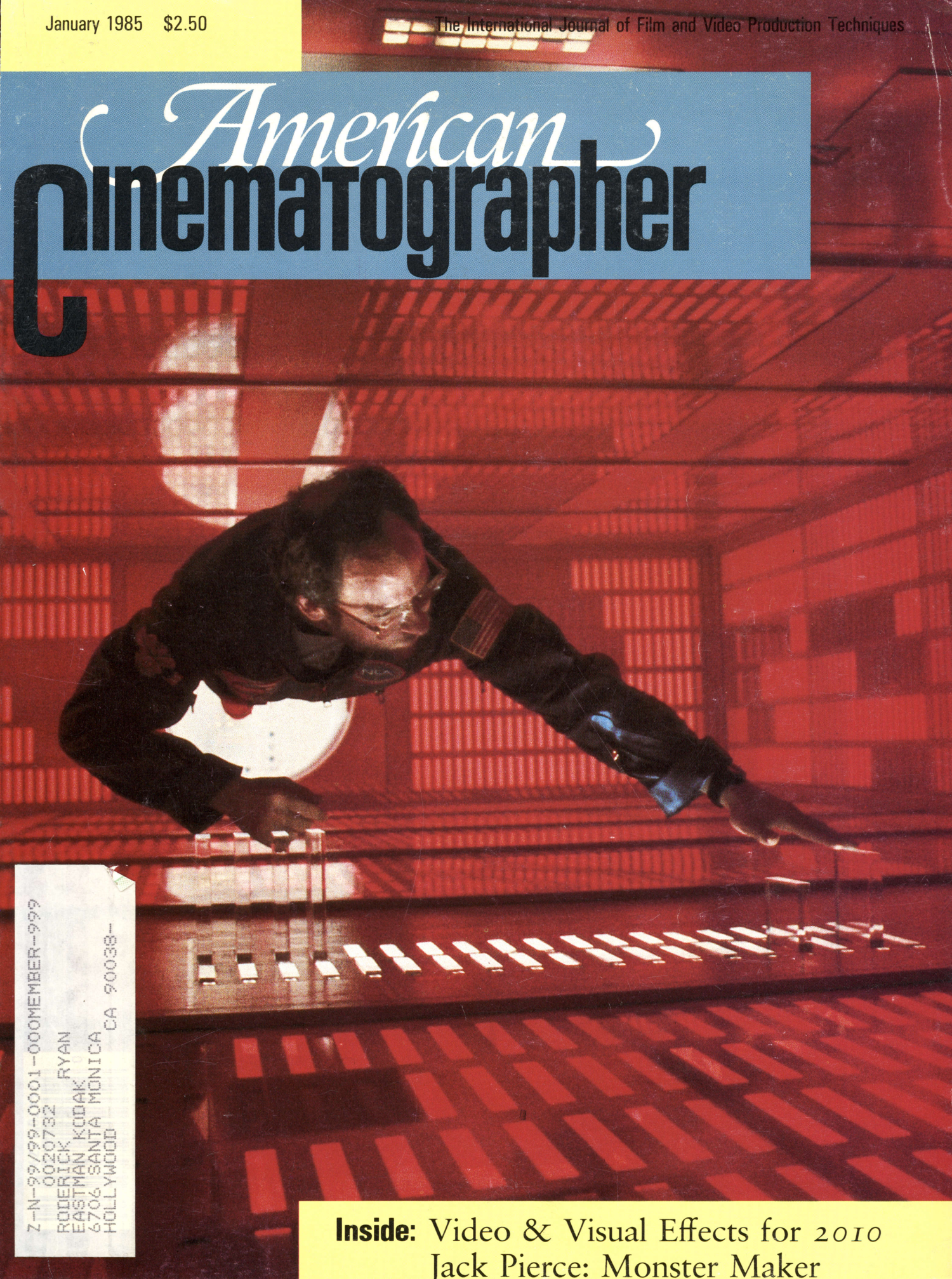
The International Journal of Film and Video Production Techniques

American Cinematographer



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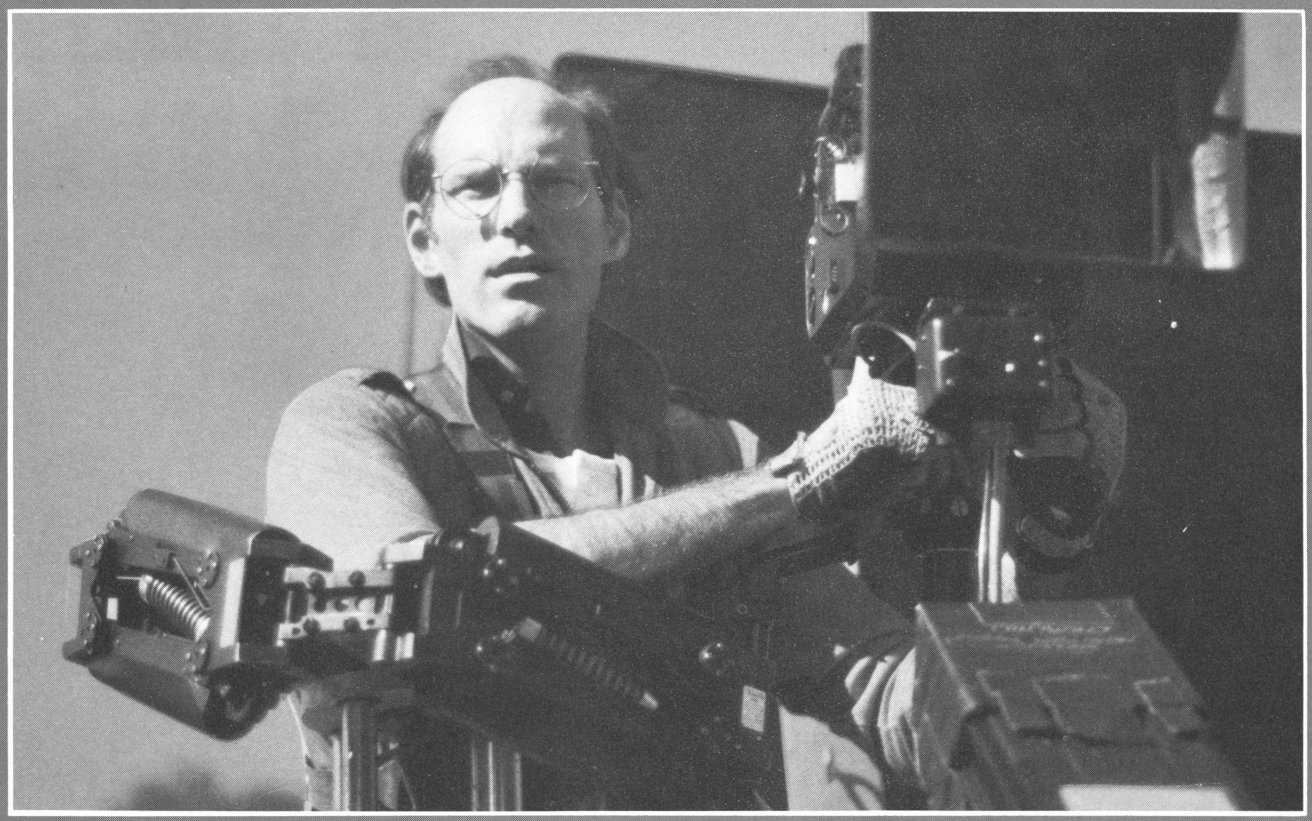
Inside: Video & Visual Effects for *2010*
Jack Pierce: Monster Maker



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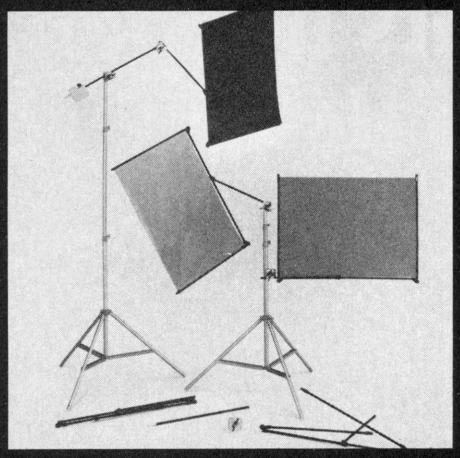

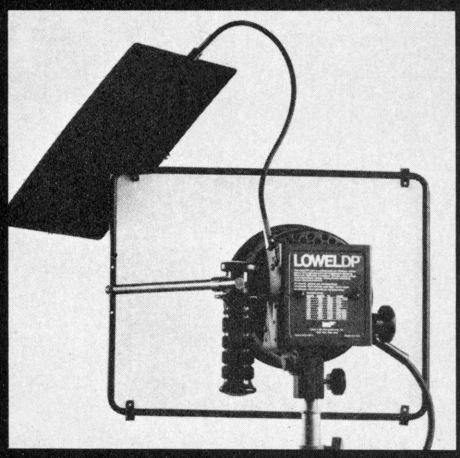

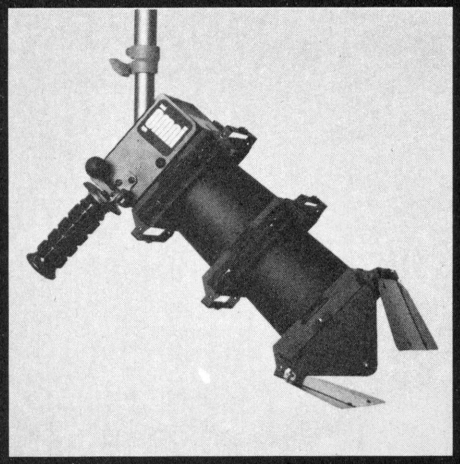

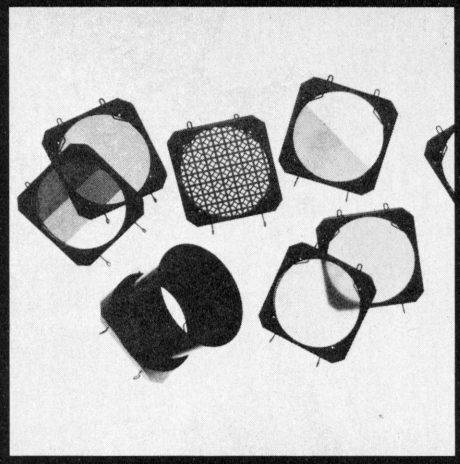

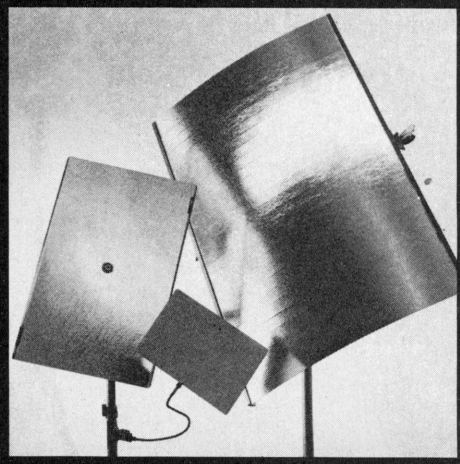

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The International Journal of Film and Video Production Techniques

January 1985 Vol. 66 No. 1

American Cinematographer

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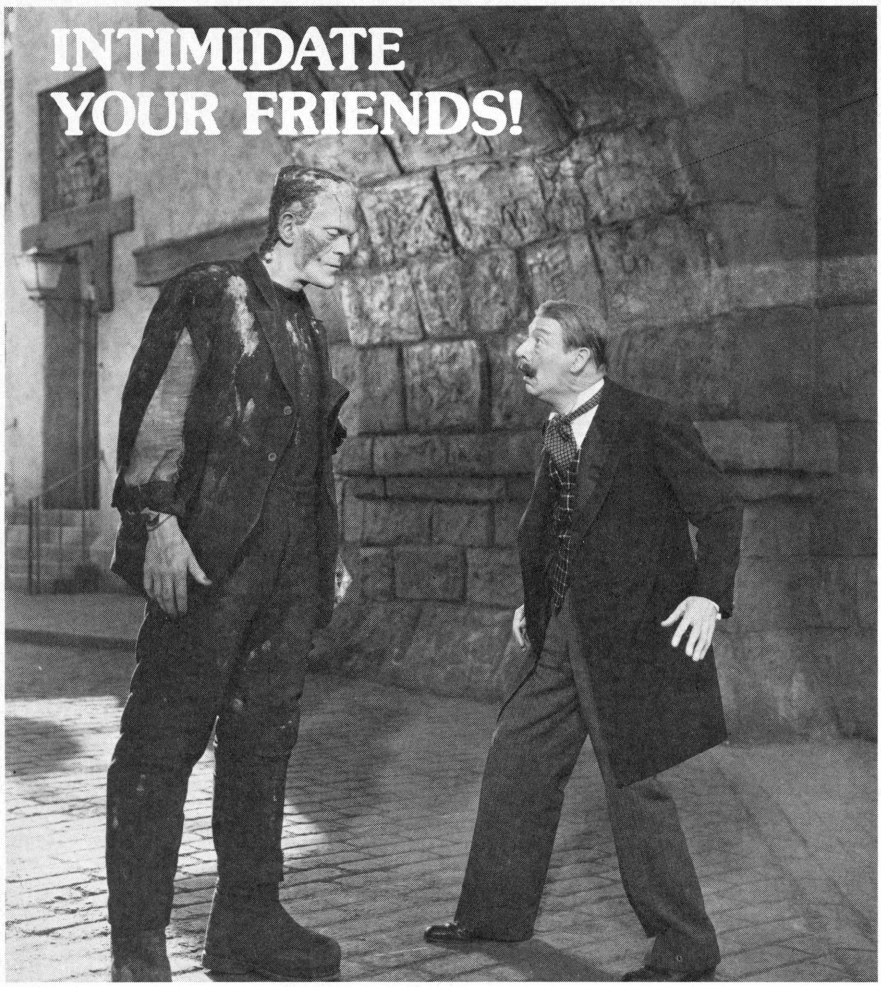
On Our Cover:
Bob Balaban as Dr. Chandra poking around inside of HAL's brain in 2010, written, produced, directed, and photographed by Peter Hyams from the novel by Arthur C. Clarke.



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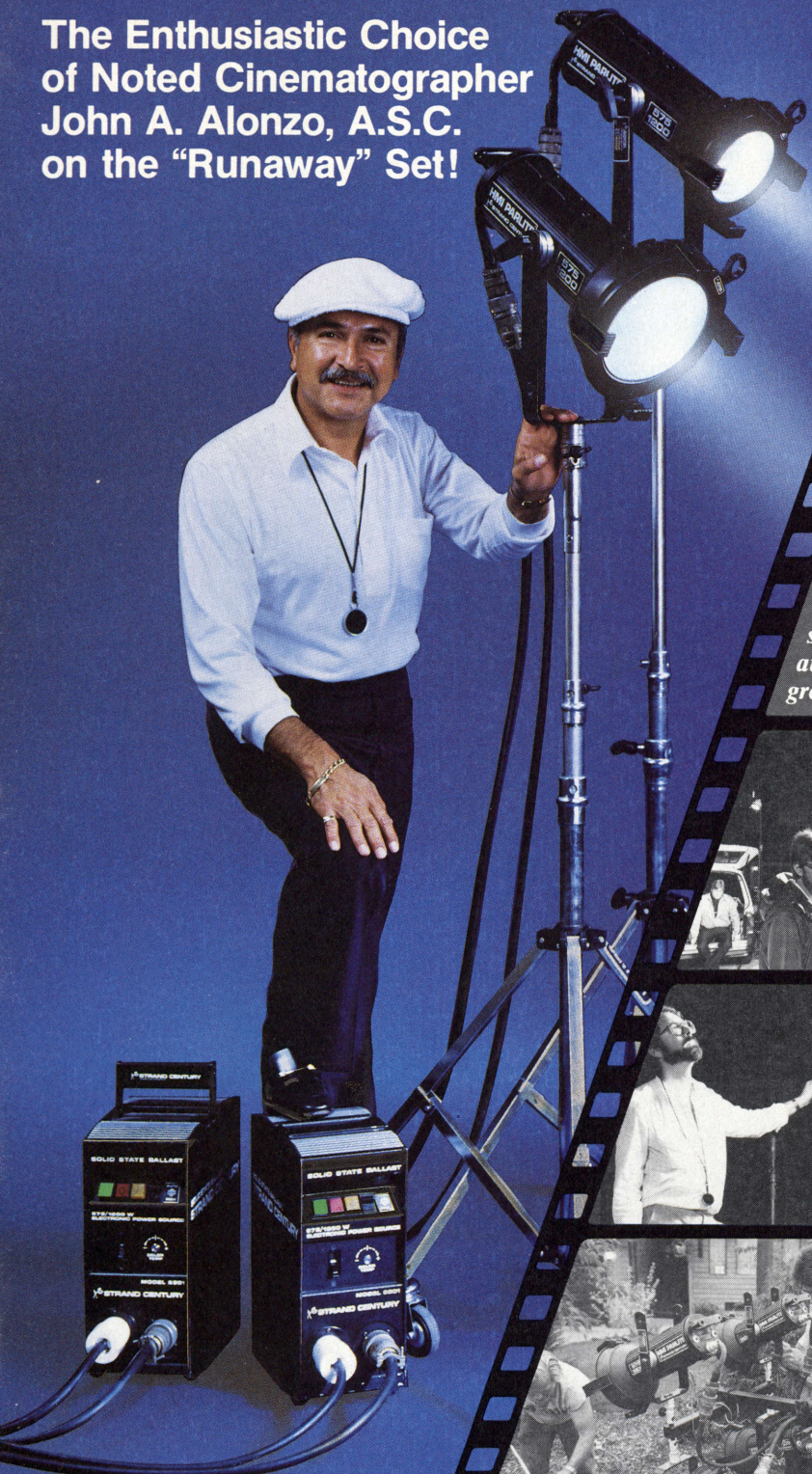

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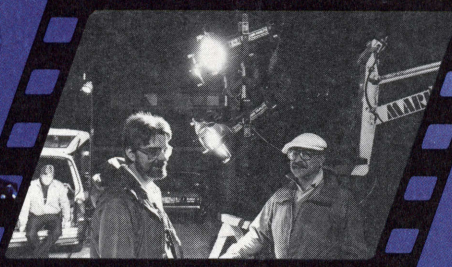

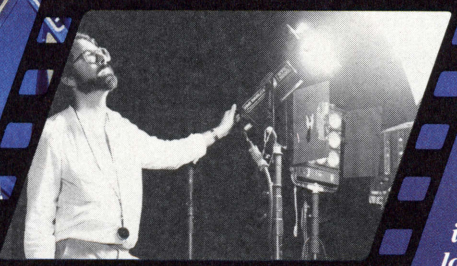

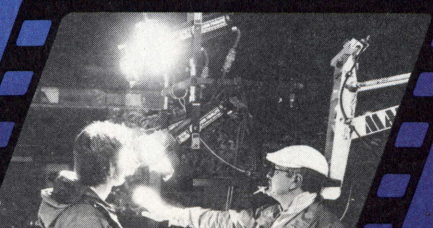

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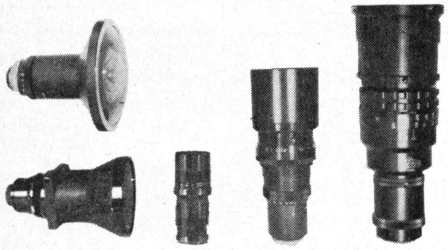

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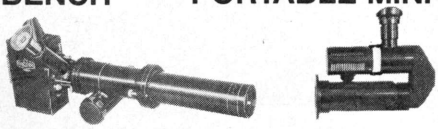

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From the Editor

MANY American cinematographers resent the employment of foreign cinematographers on productions shooting in the U.S. with domestic financing. Given the uncertainties of a freelance career in a field that is already overpopulated with talented Americans, it seems offensive on many levels to import personnel for a domestic production—especially when they are coming from countries which strictly forbid the importation of American talent for their productions.

The use of foreign labor seems to be one of the gray areas of the free enterprise philosophy in its simplest form. Theoretically a producer would be free to hire whomever he chooses, but the realities of international economics create such discrepancies in the cost of living and the prevailing salaries in different countries that the American is placed at a severe disadvantage in competing for jobs.

There is more involved, however, than a simple matter of economics. Theoretically the hiring of foreign personnel has to be justified by demonstrating that each individual is uniquely qualified to do the job. Few American cinematographers will concede that the reasons given for hiring a foreign cinematographer are anything other than hype. It is not as though the producer is consciously rationalizing a decision made for purely financial reasons. The assumption seems to be rather that the producer has been duped into genuinely believing that the foreign cinematographer has something special to offer.

Since in Hollywood many jobs are won and careers made purely on the strength of good PR, it is not unreasonable to assume that the foreign competition is playing the same game. There is, however, one factor which should be considered before dismissing all of the justifications offered for hiring a foreign cinematographer. Some European cinematographers have an educational background—in terms of general cultural exposure as well as formal education—which is considerably more sophisticated than that of many of their American counterparts. In some countries the conventional path towards a career in cinematography leads through a university or professional school which places a heavy emphasis on art history and aesthetics, and the pervading atmosphere of the filmmaking community is much more intellectual or culturally aware. In the United States film schools are much more apt to emphasize the technical end of the profession and the atmosphere in Hollywood is often aggressively anti-intellectual. Whether or not cultural sophistication is required in a great cinematographer can obviously be debated. It may be that the director just feels more comfortable with a person who understands references to art history or it may be that conceiving images in the context of rich cultural heritage makes a difference.

—RICHARD PATTERSON

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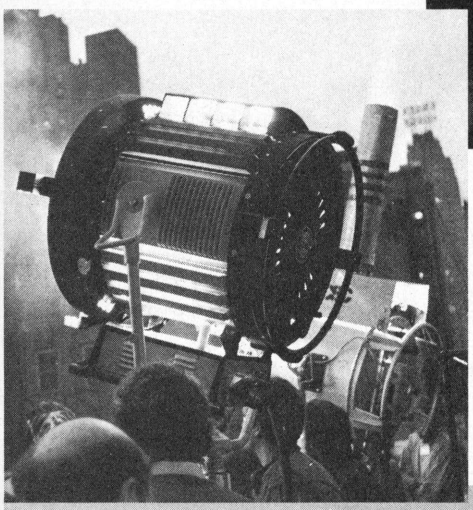

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Vancouver, B.C. – *Clan of the Cave Bear* – D.P., Jan de Bonté
Hollywood, Calif. – *Protocol* – D.P., Bill Fraker
Hollywood, Calif. – *Pluperfect* – D.P., Gordon Willis – C.L.T., George Holmes
Mexico – *Mission Kill* – D.P., Tom Denove
Hollywood, Calif. – *The Supernatural* – D.P., Peter Collister
New Orleans, La. – *Maxwell House Coffee* – D.P., Salvatore Guida
New York, N.Y. – *S.F.M. Mine Escape* – D.P., Mike Cuesta
New York, N.Y – *WISK* – D.P., Jimmy Cottner

On location shooting of 'Protocol', D.P., Bill Fraker.

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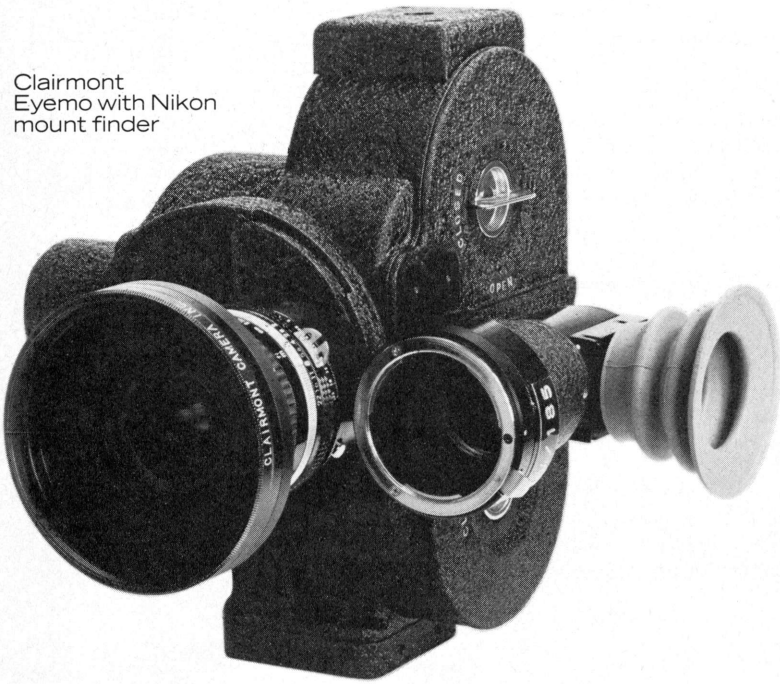


Clairmont Eyemo with Nikon mount finder

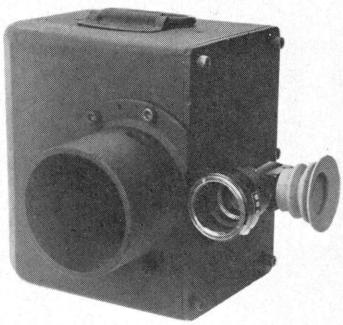
The Clairmont Eyemo is three distinct tools. All three help you bring home shots you otherwise wouldn't risk or couldn't get.

Dry

It's 8lb 11oz with a 100 foot daylight load and a 24mm Nikon lens. Electronically controlled speeds; remote on-off. If lens or camera get wiped out, it's no biggie. Eyemos are inexpensive.

Crash

Inside its crash housing (quarter-inch steel), you can let a three-story building fall onto the Eyemo. One crew actually did that. Took them a day to dig it out of the rubble, but they got the shot. This is the perfect explosions camera. Remote control, of course. Any cable length you want.

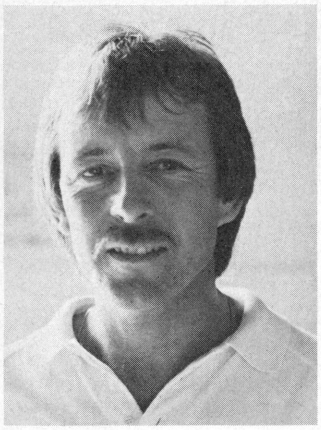


Wet

With the Clairmont underwater/splash housing, you have a camera rig that weighs 25lb 14oz loaded and lets you shoot in or under water, down to 40 feet. External controls for focus and iris. Easy to hand-hold. Reload without removing the camera. Remote-control connection.

Viewing

With the crash housing rig fully assembled, you can focus and frame through the taking lens before the shot begins. Same with *no* housing. The underwater/splash housing comes with two optical finders—one for under water, the other for above the surface.



Peter Moss A.C.S.

Australian cameraman/director Peter Moss mounts a Clairmont Eyemo (with underwater housing) on the bow of a 35lb kayak for white-water shooting in the French Alps

"The French national kayak racing champion is featured in this commercial," says Peter Moss. "Shooting the rapids, he and the boat went completely under water, several times."

360 degree rolls in the water, ending right way up

"On top of that, he deliberately did 360 degree rolls. He turned completely upside down in the water, then up again. That's a spectacular stunt. You couldn't cover it properly from the riverbank."

"We did some hand-held stuff from a raft in front of the kayak, using an ARRI 3. It was rough. I managed to cut my nose on the camera. Needed stitches."

"My trump card was to mount an Eyemo on the very tip of the kayak itself. I thought that might throw everything off balance. But it didn't —even though the kayak weighed only 35 pounds or so. We put a counterbalance inside the back."

None in Australia, none in Europe

"I was hired for the job in Australia, where I live," says Mr. Moss. "The only Eyemos I could find there have wind-up motors, poor-quality lenses and no remote control. And no underwater housings."

Only at Clairmont

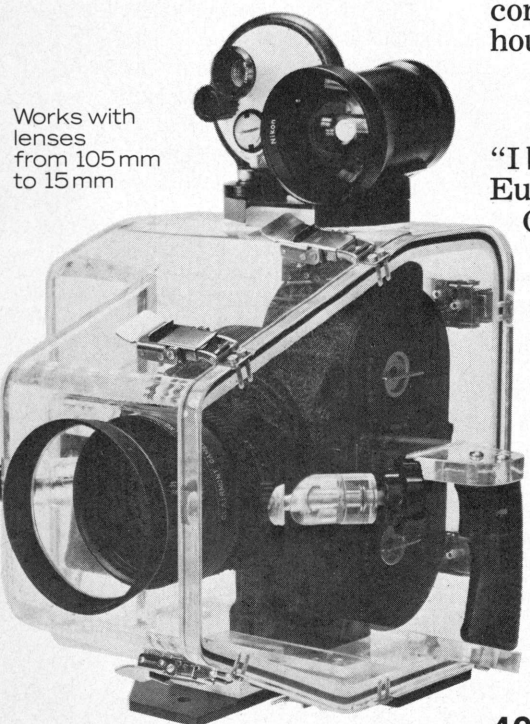
"I began calling around Europe and America. Clairmont turned out to be the only place in the *world* with usable Eyemo underwater housings."

"We used the 15mm Nikon at the kayak's bow, pointed at the man paddling. Then we mounted the Eyemo closer and used the Nikon 24mm lens. Finally, we turned the camera around for the man's POV. He operated the remote on-off."

Eyemo on kayak

Made people gasp

"That Eyemo spent about half the day underwater and all day wet. It also took a beating. But when we screened the footage, it was the Eyemo shots that really made everyone gasp."



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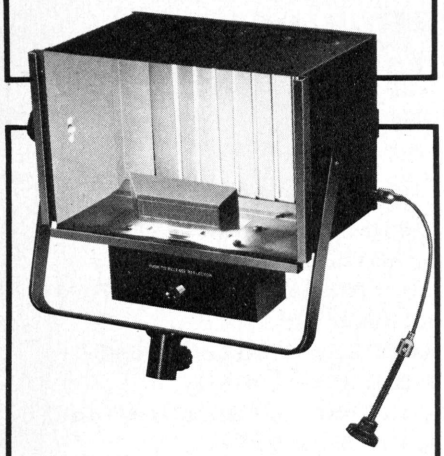

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Letters

Joystick Pan-pot

Thank you for George Rigney's article on Sound for 3-D Films (July 1984). Can you provide more information about the manufacturers and/or retailers of the joystick pan-pot described in the article?

—Mark Francis
Fulton, NY

Author Rigney says that a joystick pan-pot can be constructed from components such as Radio Shack joystick which consists of a handle moving on an x-y axis controlling four potentiometers. By adding four operational amplifiers which are controlled by the joystick pots you have a unit which can be inserted into the mix-down system after the output of any given channel of the system. The result is that the output of that channel can be panned across the four channels of the recorder. Teac made a module for their Model 10 console which had 8 pan-pots so that each of the 8 channels coming in could be panned across the four channels going out. It is sometimes possible to find these units for sale.

Feet In the Door

As an independent filmmaker, it was with great interest that I read the letters published in your November issue responding to your July editorial on the plight of new talent seeking entry into the film industry.

I would like to first address the issue of unrestricted competition for industry positions vs. the need to protect jobs of established professionals in a crowded marketplace. It is my position that in a free society, competition is a mandate, and not an alternative. It would seem logical that experienced professionals have an inherent competitive advantage over newcomers based on their more extensive credits, and do not need the added benefit of union restrictions on membership to safeguard their positions. Unions were created to protect labor from abusive treatment by employers, and not to restrict entry into occupational categories.

As to the frustrations of those trying to get their foot in the door, I would make the following recommendation:

Stop waiting for someone's permission. What it takes to be a filmmaker is to make films! This was the lesson learned by our industry's first independents in their struggle against the Patents Trust. Today's independents should seek to follow their example.

In doing so, it may be discovered that for every "frustrated" artist or technician, there is an equally "frustrated" independent producer unable to undertake a film project, in part due to the high cost of employing union professionals.

As a number of artistically and financially successful films have proved, collaborations of just such "frustrated" individuals often result in a marketable product produced on a fraction of the budget considered necessary by prevailing industry standards.

—Edward L. Linder
Douglasville, GA

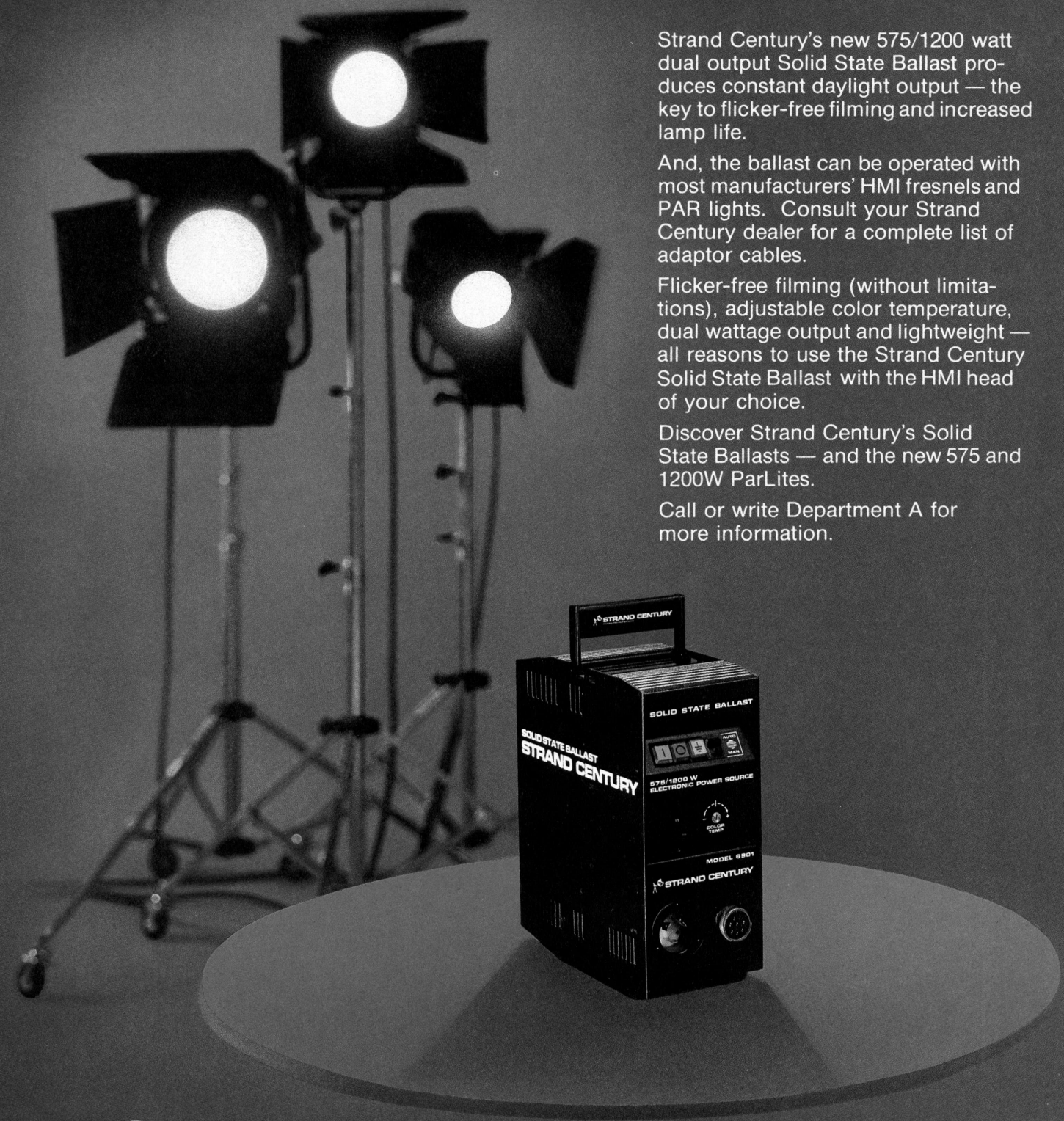
Opportunity Knocks

I also saw your July 84 Editorial in American Cinematographer, but unlike others which have written you, I am not going to spend all of my time deriding the system.

Albeit there are many problems . . . schools teach vocations which have very few openings. Worse, schools rarely have any workable system to screen out students which have no natural abilities for a chosen vocation, and thus are busy flooding an already overcrowded job market with graduated misfits.

Unions, on the other hand are

Now...Flicker-free Filming with HMI's. But, Only with SCI SOLID STATE BALLASTS!



Strand Century's new 575/1200 watt dual output Solid State Ballast produces constant daylight output — the key to flicker-free filming and increased lamp life.

And, the ballast can be operated with most manufacturers' HMI fresnels and PAR lights. Consult your Strand Century dealer for a complete list of adaptor cables.

Flicker-free filming (without limitations), adjustable color temperature, dual wattage output and lightweight — all reasons to use the Strand Century Solid State Ballast with the HMI head of your choice.

Discover Strand Century's Solid State Ballasts — and the new 575 and 1200W ParLites.

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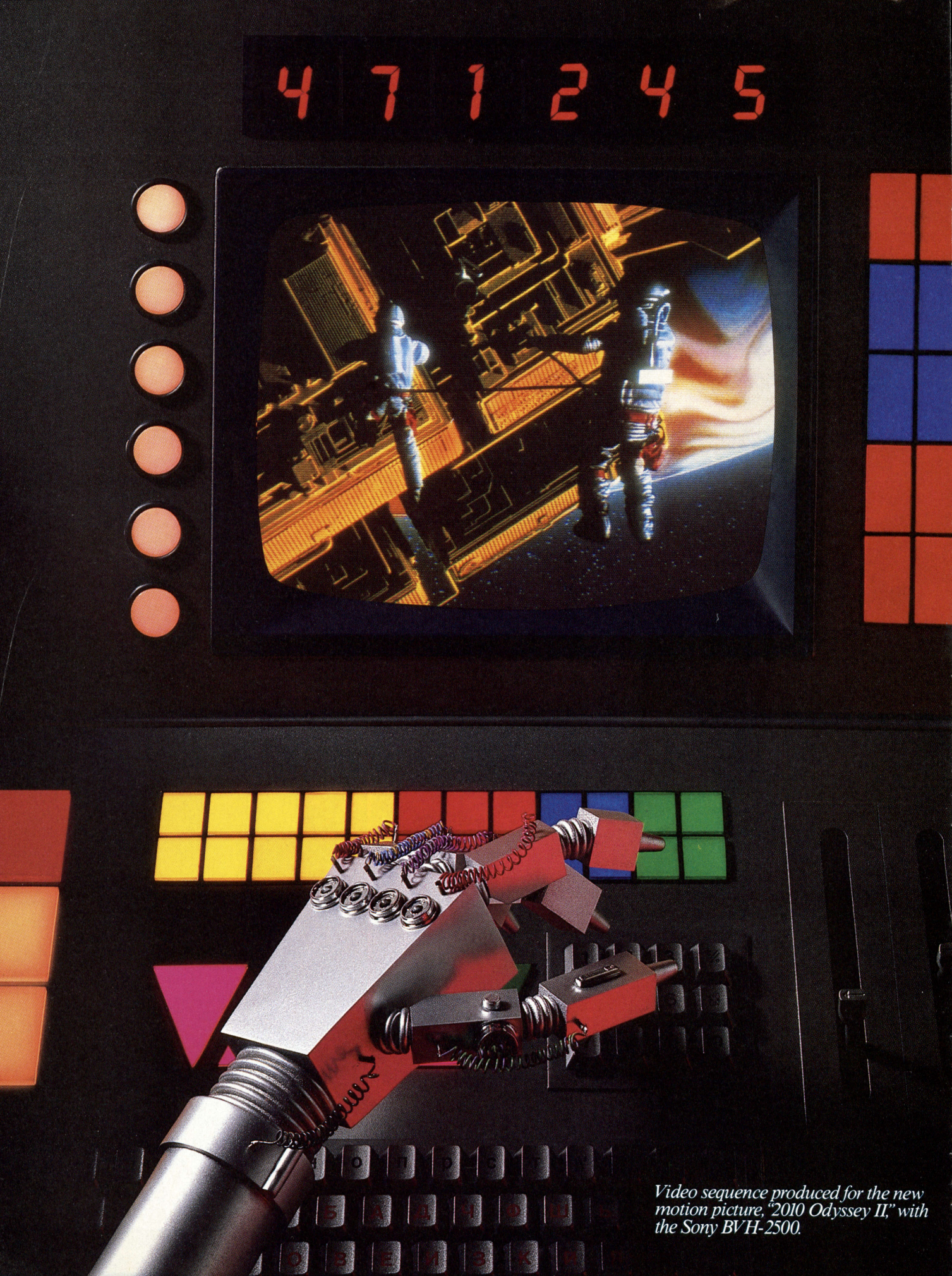

Video sequence produced for the new motion picture, "2010 Odyssey II," with the Sony BVH-2500.

"IF YOU'RE NOT USING SONY, YOU'RE NOT USING YOUR IMAGINATION."

Clark Higgins, President, InVision

At Sony, we believe the creative process shouldn't be short-circuited by the limitations of your video equipment. Which is why we created the BVH Series.

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As you'll realize from the examples mentioned below, the Sony BVH Series is equipped to answer everyone's creative needs.

Yet each recorder, from the three-hour BVH-2180 to the High Definition Recorder HDV-1000, is based on the same piece of Sony ingenuity: the BVH-2000. It's the backbone and the workhorse of the industry. And has brought innovations such as extended dynamic tracking, advanced onboard diagnostics and utter reliability to 1-inch videotape recording.

It's also made the following possible.

THE REAL WINNER OF THE 1984 SUMMER GAMES: THE BVH-2700.

The single most amazing thing about the Games wasn't the U.S. Gymnastics Team victory or the first women's marathon, but the Super Slow Motion replays brought to you by Sony.

This unprecedented Super Slow Mo system did more than deliver a flawless performance day in and day out, for two solid weeks, covering over 180 hours of programming. It completely redefined slow motion.

Slow motion replays have never appeared with so much definition. Undoubtedly, the Sony Super Slow Mo system will change the way the world sees sports forever.

THE BVH-2500. WITHOUT IT, THERE WOULDN'T BE A "2010 ODYSSEY II."

Even for MGM, the creation of complex, animated action sequences seen simultaneously on 80 video monitors for the film "2010" was a monumental job. Clark Higgins, the production head, was given this seemingly impossible task made even more impossible by a shortened shooting schedule. Sony was the only place to turn.

Because only Sony has developed a still-frame videotape recorder. One so revolutionary it has been awarded an Emmy. Not only did the BVH-2500 complete 50 complicated animation sequences two weeks ahead of schedule, but it accomplished something else extraordinary: a job done on budget.

VIDEO RESOLUTION THAT GIVES FILM A RUN FOR ITS MONEY.

Sony has opened a vast new universe in video with High Definition Television. The excellent picture quality has given filmmakers a reason other than economics to use video for major film and TV productions.

The HDV-1000, along with the continuing development of other peripherals, will pave the way for an even wider use of video.

A fact recently proven at Robert Redford's Sundance Film Institute, where the most prominent actors, directors and even students see their ideas come to life with the aid of the HDV-1000.

HDVS's performance was so impressive, it was deemed the future of video.

So, if your video equipment inhibits your imagination, there's one reason for it—you're obviously not using Sony. For information, contact your Sony representative.

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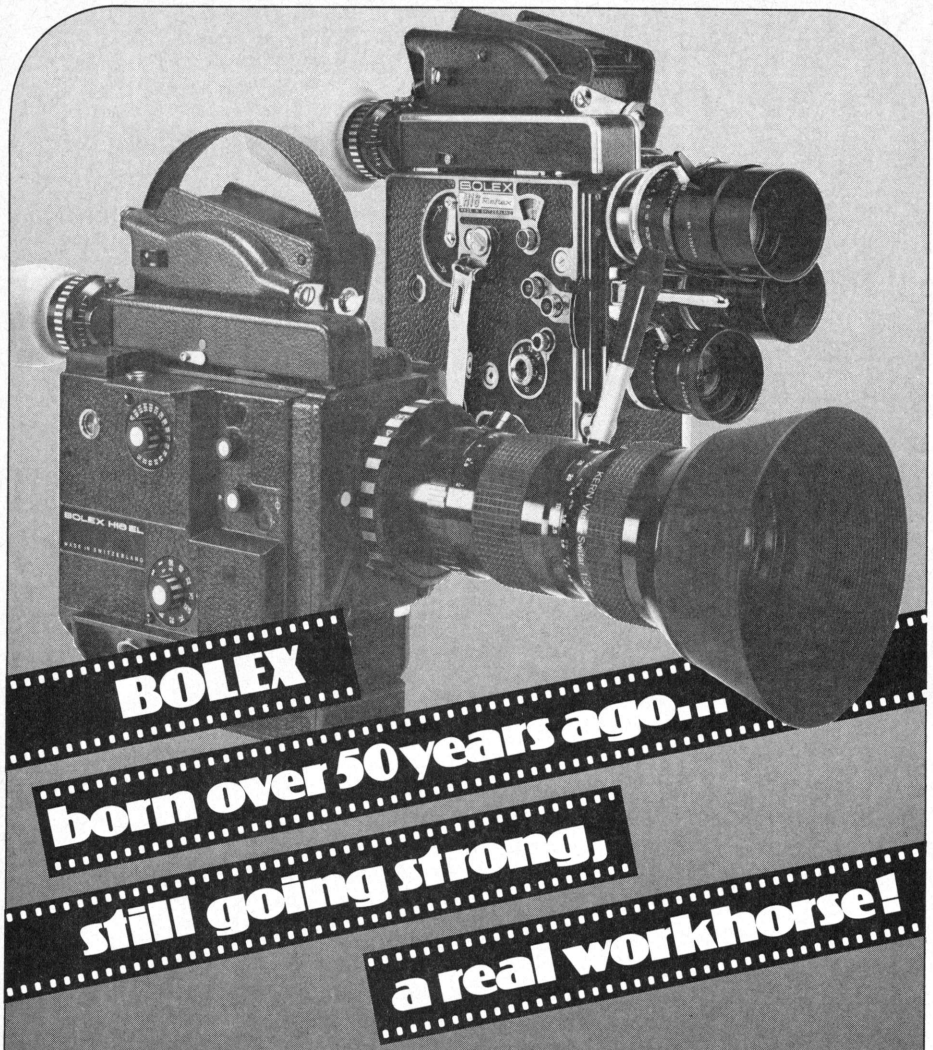

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BOLEX
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a work monopoly, which are often found around bigger shops. Unions not only slow technology and growth; but appear to be more friends of big business, than of their memberships, by helping to weed out weaker competition, and preventing new competitors from ever wanting to start, making such too expensive. Nepotism seems to abound.

Having in my youth, been inside one of those high profile dream land jobs in an ivory tower—commercial art—I can guarantee it is not all downhill, or rosy. I shall never forget the mad stampede of people trying to get in. They were everywhere, doing all sorts of low things . . . and for what? It sure wasn't high pay, nice hours, or a terrific place to work. So why this rush of people?

The day I gave it up, there was immediately a replacement at my board, I strongly doubt if the studio ever even missed me. Oh, I remember well those days in a commercial art studio. You'd sit around all day throwing paper darts. Come 5 pm (quitting time in another occupation) in comes a salesman for the shop with a rush job (they were all rush jobs!), and the whole crew would have to work through the entire night if necessary to complete it.

I went into machine tool. Must have been a pretty good artist, as it didn't take me long to migrate from unskilled production, into the tool room, and had free access to the front office. I never regretted leaving commercial art. (I note many of the American Cinematographer's advertisers, are: *Machine Tool Shops* into specialty work)

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—Dale M. Perrill
Rochester, Michigan

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MUSIC VIDEO FILM

Not because we dislike the product, but because Music Videos usually aren't videos — they're films. Michael Barnard Productions shoots a lot of Music Films — here, for example, doing Sam Harris for Motown. Michael's camera choice — an Arriflex 35III from Birns & Sawyer. As Michael puts it, "The look I'm after demands shooting on film, and the equipment I'm after must perform flawlessly. Birns & Sawyer is always my first choice."

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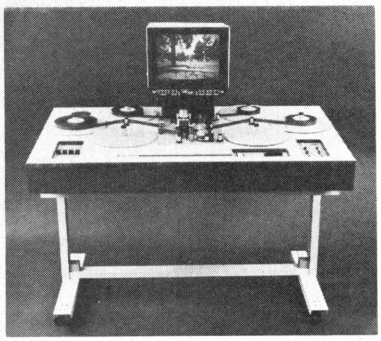
New Eastman color LC print film 5380/7380. It's designed specifically to make film images look better on television. So, whether producing, syndicating, or at home watching the end result, you'll get a lift from the improved shadow detail. The softer highlights. The overall film look.

5380/7380 film has exceptional color reproduction and retention, too. And properly processed, its color is intended to last up to a century. Even longer if carefully stored under recommended conditions.

Next time you order prints for direct television transmission, or for video transfer and other special low-contrast applications, ask for 5380/7380. And get results of the highest quality.

For more information, call the Eastman Kodak Company Motion Picture and Audiovisual representative nearest you. Atlanta, 404-351-6510. Chicago, 312-654-5300. Dallas, 214-351-3221. Hawaii, 808-833-1661. Hollywood, 213-464-6131. New York 212-930-7500. San Francisco, 415-928-1300. Washington, D.C., 703-558-9220. Montreal, 514-761-3481. Toronto, 416-766-8233. Vancouver, 604-926-7411.

Eastman color LC print film 5380/7380. Ask for it.



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The Bookshelf

Nestor Almendros, top director of photography, is the author of **A Man with a Camera,** a significant book that combines his autobiography with a report on his professional activities. He explains in detail the technical and creative aspects of his work, and defines the nature of his collaboration with such directors as Robert Benton, Alan Pakula, Terrence Malick, Francois Truffaut and Eric Rohmer *(Farrar Straus Giroux, New York, $17.95).*

A comprehensive and factual survey by Jack Imes Jr., **Special Visual Effects** describes the great variety of current state-of-the art techniques. It covers such procedures as in-camera effects, 2- and 3-dimensional animation (cartoons and puppets), front and rear projection, mattes, and mechanical effects and props. Well illustrated and clearly written, this book provides abundant practical information. *(Van Nostrand Reinhold, New York, $30.50).*

James Monaco's insightful and comprehensive overview of the U.S. movie industry, **American Film Now** is at long last reissued in an updated edition. It offers a well-informed, lucid and often witty appraisal of film as business and art, and comments intelligently on the achievements of leading filmmakers *(NY Zoetrope, New York, $24.95; NAL/Plume, New York, $14.95).*

Valuable as a consumer guide, **How to Select and Use Home Video Equipment** by Marjorie Costello and Michael Heiss offers expert advice, free of technical jargon, for an educated choice among available VCRs and their anticipated enjoyment *(HP Books, Box 5367, Tucson, AZ 85703; $9.95 + $1.95 handling).*

Ably edited by G. William Jones, **Talking with Ingmar Bergman,** taped at an SMU student seminar, reveals the Swedish director's insight into cinematic concepts and techniques, and his struggle to come to terms with life and himself through his art *(So. Methodist U. Press, Dallas, TX, $25/12.50).*

Published in one volume, **Persona** and **Shame** are the scripts of the most troubling films Ingmar Bergman ever wrote and directed. They deal in depth with the destruction of a personality and the breakdown of civilization *(Boyars, New York, $6.95).*

A knowledgeable British Film Institute study, **A New Deal in Entertainment** by Nick Roddick examines Warner Bros. films of the 30s and finds in them an awareness of public mood and a reflection of the times' social changes *(U. of Illinois Press, Champaign, IL, $22.95/13.95).*

The 14th edition of **Audio Video Market Place 1984** includes 5700 cross-indexed entries, blanketing the audio and video industries' manufacturers, producers and distributors, services, technology and applications. A 10,000 name directory of individuals and firms is included. *(Bowker, New York, $45 + shipping).*

Production facilities and technical/creative personnel in 54 major film/tv producing countries are listed in **Kemps International Film and Television Yearbook 1984–85.** All 20,000 entries are classified by category and country in this highly serviceable and authoritative directory *(Bowker, New York, $50).*

Portraits of Hollywood, Broadway and other celebrities are collected in **Louis Dahl-Wolfe: A Photographer's Scrapbook.** Rather than glamorizing their subjects, these pictures display, for the most part, a simplicity and directness that bring out

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realistically the often concealed nature of the sitter's personality *(St. Martin's, New York, $16.95).*

Painter, printmaker and set designer, David Hockney reveals his photographic creativity in a brilliant and exciting collection of montages, **Cameraworks.** Hockney's analytical technique synthesizes his perception of reality's "endless sequence of details which our eyes deliver to our mind" *(Knopf, New York, $50).*

The lives, both privileged and deprived, of child performers in Hollywood's heyday are recalled in **Twinkle, Twinkle, Little Star** by Dick (formerly Dickie) Moore. It is mostly a dismal picture of hectic careers where surface glamor often conceals uncertainty, frustration and a gnawing fear of growing up *(Harper & Row, New York, $16.95).*

In **Malcolm Lowry: A Biography,** Douglas Day notes the influence on the novelist's literary style of *Caligari, The Last Laugh* and other German films of the 20s. The "richness of texture and motion" of Lowry's later works was skillfully transferred to *Under the Volcano,* John Huston's sensitive film *(Oxford U. Press, New York, $9.95).*

Bob Woodward's investigative probe of "the short life and fast times of John Belushi," **Wired** reveals the dark side of American show business. Fascinating and tragic, Belushi's downhill slide is told in horrifying detail as he struggles to survive his uncontrollable addiction *(Simon & Schuster, New York, $17.95).*

Performers generally cast in supporting roles are honored with portraits and biographical sketches in **More Character People** by McClure, Twomey and Jones. Akim Tamiroff, Otto Kruger, Elsa Lanchester are some of the regulars included whose presence gave films an aura of credibility *(Citadel Press, Secaucus, NJ; $19.95).*

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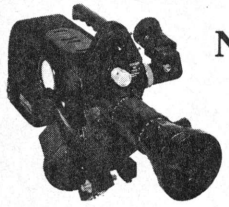

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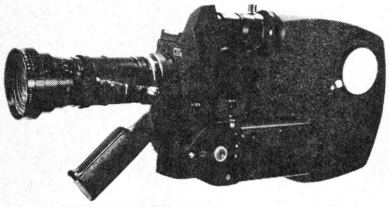

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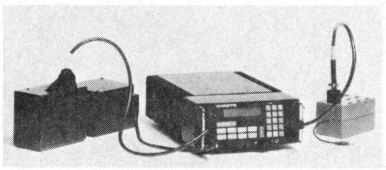


Christie Electric Corp. of Torrance, CA, is introducing CASP, the first fully programmable and universally compatible battery charger-analyzer. The name CASP is an acronym for the product's four major functions, charger-analyzer-sequencer-power supply. CASP will process batteries faster, improving turn-around time; more thoroughly, improving reliability and with less operator involvement, making CASP economical.

CASP has six ports which can accommodate six entirely different types of batteries. Each port can be independently programmed to any sequence of charges or discharges. The microcomputer controller compiles data during the sequence, analyzing the batteries' condition.

The unit's four distinct functions and two options make it a highly flexible piece of equipment. An optional DC module adapts CASP to a lightweight, portable charger/analyzer. A printer module can be added to provide hard copy function and test results. CASP may also be used as a programmable power-supply rated from 0 to 50 volts.

For further information, please contact Christie Electric Corp., Communication Support Equipment Division, 20665 Manhattan Pl., Torrance, CA 90501, (213) 320-0808.

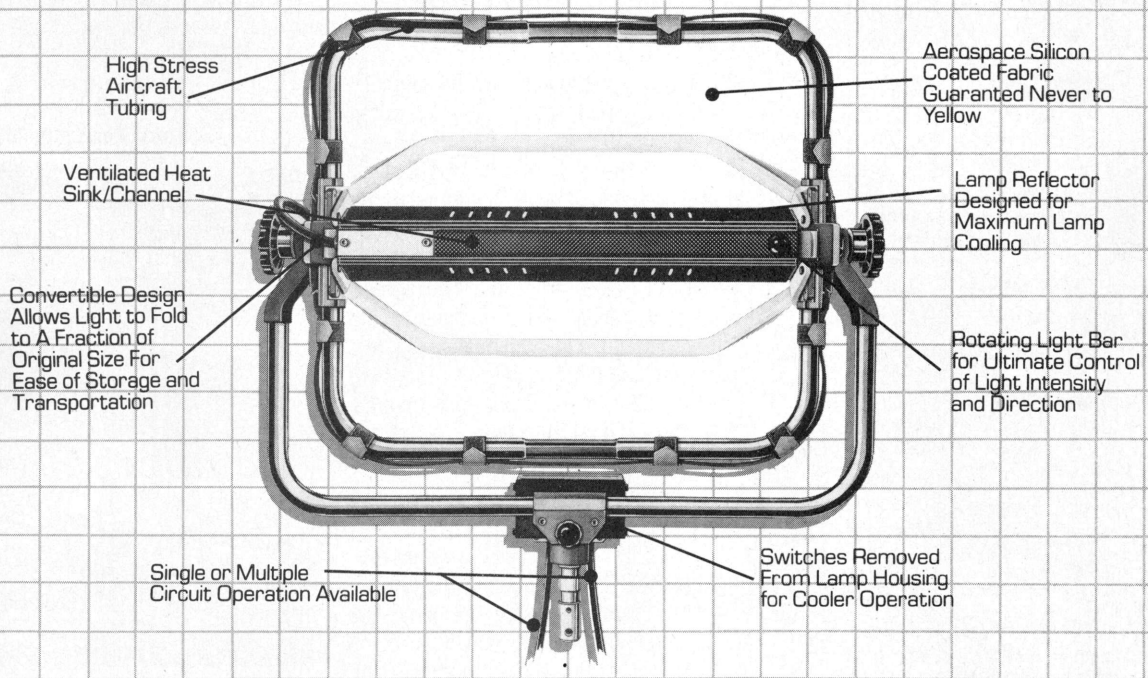
Fuji's Newest

Fuji Photo Film U.S.A., Inc., has announced the introduction of the new Fujicolor high speed negative film AX 8514/8524, the world's fastest motion picture color negative film, with an exposure index rating of 500 in tungsten light and 320 in daylight with a compensating filter. The new super high speed film directly replaces the current high speed negative film AX 8512/8522 (rated E.I. 320 tungsten and 200 daylight) and retains the same advanced technology and superior performance characteristics of that product.

Fujicolor AX 8514/8524 will be available in 35mm (8514) and 16mm (8524) formats. The increase in film speed to E.I. 500 (an increase of ⅔ stop) is achieved by the application of Fuji Film's revolutionary emulsion technologies to the existing film formulations to produce a motion picture film of super high sensitivity and improved grain definition and sharpness. Fuji's patented film emulsion technologies include the development of advanced double structure grains, L-coupler, super DIR coupler and an image amplifier releasing coupler that were first applied to Fujicolor HR1600 print film.

Fujicolor AX 8514/8524 exhibits the same excellent performance characteristics as the current motion picture films, such as natural color rendition, excellent suitability for mixed lighting sources and for fluorescent lights, with improved grain structure in shadow areas. Furthermore, the new film has a wide exposure latitude. If shooting under adverse lighting conditions requires even higher sensitivity, the E.I. rating of AX 8514/8524 can be doubled to 1000 by forced processing, with virtually no change in the color balance.

WE'VE TAKEN SOME HEAVY TECHNOLOGY AND MADE LIGHT OF IT.



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The most comprehensive because we offer five different sizes in wattages from 1,000 to 16,000 watts with more lamping, switching, and plugging options than ever before—all to help you light up, even when power is a problem.

Sensibly designed because all Modulights fold to a fraction of their operating size for storage and transportation. And because we know that big is soft, we designed the largest apertures ever around durable, lightweight tubular frames that allow you to put the light where you want it so easily and quickly you'll be amazed.

Because seeing is believing, contact the distributor in your region for a listing of dealers in your immediate area. Chances are good there's a Modulight waiting for you just around the corner.

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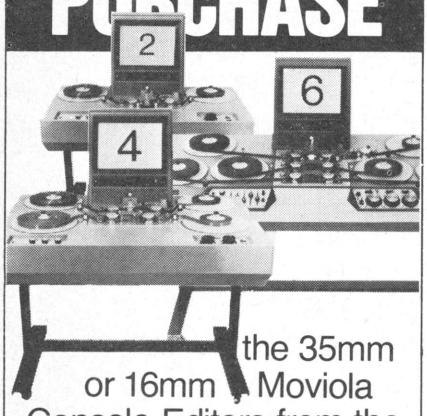

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The new AX 8514/8524 is processed under ECN-2 (either ferricyanide or persulfate bleach). Fujicolor High Speed Negative Film AX 8514/8524 is manufactured under completely automated control by an integrated production system assuring uniform batch-to-batch quality.

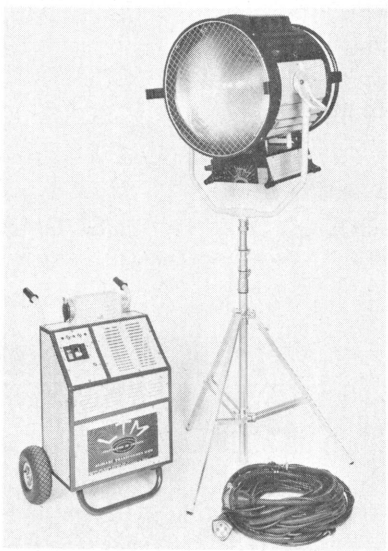
For more information contact Fuji Photo Film, 350 Fifth Ave., New York, NY 10118.

Luxarc 12000

LTM has developed the largest HMI fresnel lighting instrument ever built to meet industry demands for a more reliable and efficient high intensity light source. The output level of LTM's new 12K is superior by 25% to the 225 amp carbon arc.

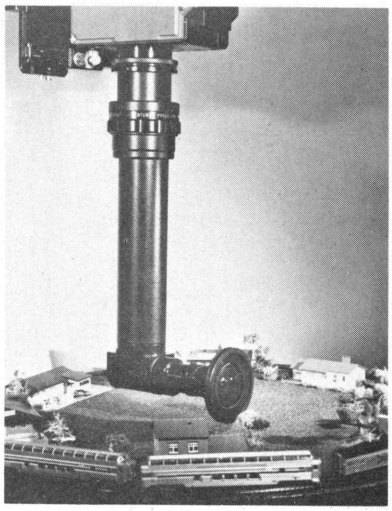
The LTM Luxarc 12000 is equipped with a 24 inch diameter fresnel lens, and operates on 110 volts/60 cycles/A.C. All major components, including the transformer and striker unit are built by LTM, the largest manufacturer of professional HMI lighting instruments in the world.

The Luxarc 12000's rugged sheet metal and cast aluminum housing ensures rigidity, and special vents allow ventilation for proper heat dissipation for longer electronics and bulb life.



For additional information on the LTM Luxarc 12000, contact: LTM Corporation of America, 1160 North Las Palmas Avenue, Hollywood, CA 90038. (213) 460-6166.

Century Periscope V16



The Century Periscope V16, designed exclusively for 16mm & video application, is a compact and economical version of its industry standard V35 Periscope. Features include interchangeable camera mounts, interchangeable lens adapter system, 1:1 relay system and fast, high resolution optics (T/3.5) with only 1 stop exposure compensation.

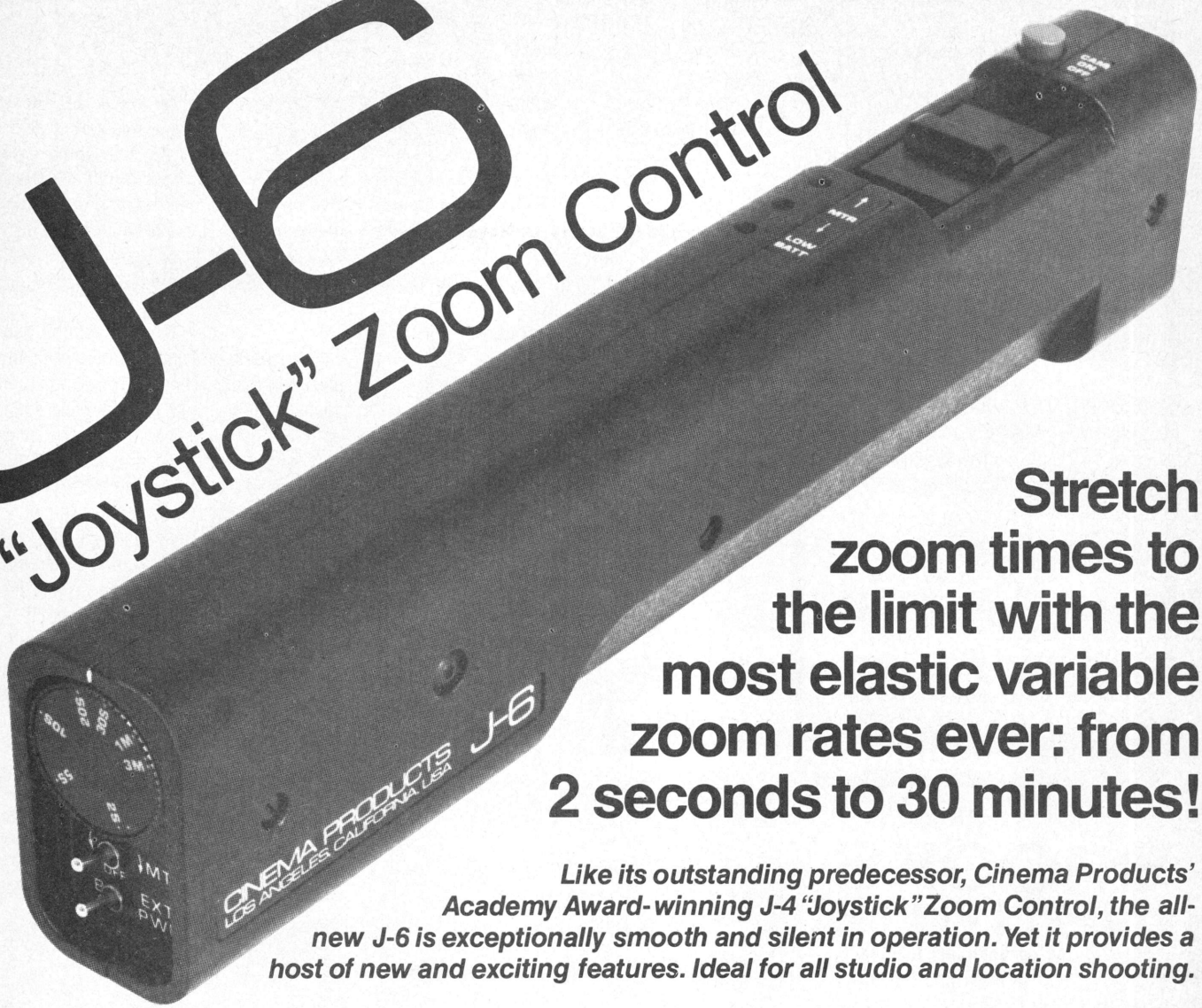
For further information, contact Century Precision Optics, 10713 Burbank Blvd., N. Hollywood, CA 91601. (818) 766-3715.

Suspension Mount

Light-Wave Systems announces a new design configuration for their model range of directional microphone suspension mounts. The move from abs injection molding to precision (in house) hand casting of a tough new urethane has allowed for a new shape.

The material is oil-loaded and self dampening. All parts are fully interchangeable with earlier models that have been in use over the last nine years. Most distinctive is the new handle. It is cast as a single part and carries either a 5/16" or 3/8" brass insert

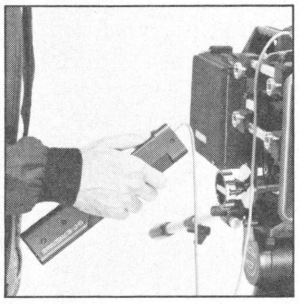
J-6 "Joystick" Zoom Control



Stretch zoom times to the limit with the most elastic variable zoom rates ever: from 2 seconds to 30 minutes!

Like its outstanding predecessor, Cinema Products' Academy Award-winning J-4 "Joystick" Zoom Control, the all-new J-6 is exceptionally smooth and silent in operation. Yet it provides a host of new and exciting features. Ideal for all studio and location shooting.

- ☐ Designed to operate with most 16mm, 35mm, and EFP video cameras currently in professional use. Compatible with all existing J-4 zoom motors.
- ☐ Completely self-contained. Cast aluminum case (with recessed controls and connectors) contoured for convenient handheld operation. Features internal 12V rechargeable battery and solid state circuitry all in one rugged housing, eliminating the need for a separate control box.



- ☐ The J-6 can also be powered directly from the camera head (10-35VDC), if desired.
- ☐ "Joystick"-type sliding thumb control provides logarithmic speed variation (from zero to preset maximum) in direct response to thumb position.
- ☐ Gradual start/stop system permits extremely smooth precision feathering of the zoom throughout the speed range.
- ☐ New highly reliable solid state electronics feature an LVD transformer, eliminating all microswitches, cams and pots. Standard plug-in ICs can be replaced in the field, if necessary. No potted "mystery" modules required.
- ☐ Provides quick return to the mark at 20× the set speed.
- ☐ Positive indication when operating at very slow zoom rates up to 30 minutes. Bright LEDs indicate "Low Voltage" and "Motor On."
- ☐ Convenient remote camera on/off switch. Optional VTR Start/Stop and Return Video switches.
- ☐ Direction-reversing toggle switch assures easy motor mounting and realignment with sliding thumb control.

For further information, please contact:

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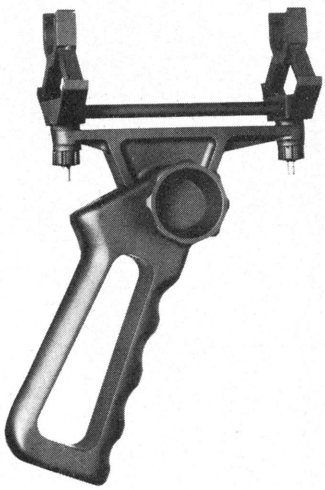
in the base – for boom use. The carriage section is now cast as one part. The isolation carriage, as a single unit, attaches directly or through the Slimline windscreen at two initial lug locations. Models for short range microphones (photo above) weigh just 5½ ounces and the long range models weigh 6¼ ounces.



Inquiries may be addressed to Les Drever at Light-Wave Systems – 8251 Columbus Ave., Panorama City, Calif. 91402. (818) 893-6796.

New Hot Pockets

Extended location work in cold weather is tough on crews. Cold people make for expensive production delays. Now, a non-fuel, non-flammable hand and body warmer is available that won't interfere with actors' costumes or workers' mobility, and is completely safe.

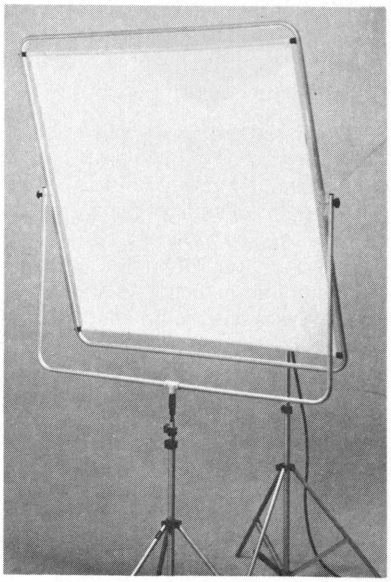
First introduced in Japan last winter, the Hot Pockets pouch provides an actor or crew member with up to 20 hours of comfortable heat without wires, battery, flame or fuel of any kind. After removing one or more pocket size, orange pouches from its plastic, protective bag, shake or knead it for two minutes until heat is produced. Place the pouch in a shirt, sweater, pocket, costume, or glove, and the worker will experience heat comparable to that given by a traditional heating pad set at medium. The Hot Pockets pouch can provide a blanket of warmth that will keep the user comfortably warm for 20 hours.

An independent testing lab confirmed Hot Pockets completely safe and non-toxic. The six governmental agencies that could possibly find fault with the product communicated that they were not concerned with its safety. The heat is completely safe and will not burn. Each pouch has a shelf life of 2 years and once activated can be returned to the plastic container and resealed from air for later use if used for less than the prescribed time period.

For more information call (404) 451-7737, or write to EJW North America 2060 Peachtree Industrial Ct., Suite 315, Atlanta, GA 30341.

Panels, Reflectors

Visual Departures, Ltd. has introduced two new products: Flexfill diffusion panels, and Flexfill collapsible reflectors.



Professional photographers and cinematographers now have a lightweight diffusion panel that maximizes creative flexibility and control. Taking only two minutes to assemble, Flexfill diffusion panels are a transluscent fabric panel that is stretched and braced by a free-standing aluminum tubular frame.

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(518) 963-7080

Fold-away legs give the panels sturdy support.

Flexfill panels' unique construction effects contrast control and light diffusion. Because Flexfill panels are not enclosed, they can be used with both quartz and strobe light sources.

Easy to handle, Flexfill diffusion panels can be "flown" from ceilings and overheads or secured to lightstands for outdoor use.

It takes just five seconds to open or close Flexfill collapsible reflectors, specially designed to fold to ⅓ of its size for easy transport.

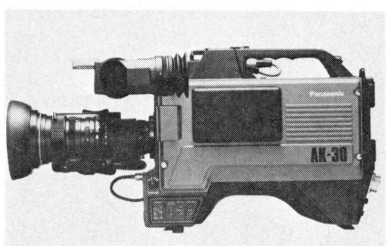
These reflectors are a lightweight, versatile alternative to bulky conventional reflectors. Because they are made with tough fabrics and a flexible metal rim, you can open and close Flexfill with a snap of the wrist.

Flexfill comes in 48", 38" and 20" diameter sizes and collapses to 17", 14" and 7", respectively. Surface choices include: white, translucent, reversible silver/white, gold/white and black. A gooseneck adjustable holder for the 38" size offers mounting and angle adjustment on standard lightstands or tripods.

For further information contact: Visual Departures, 1601 Third Ave., New York, NY 10128. (212) 534-1718.

Panasonic Color Video

Panasonic Industrial Company highlighted a new color video camera of outstanding quality at the recent SMPTE Exhibition in New York City.



Electronic sophistication was built into the AK-30. It features digital zone registration with memory and dual automatic white balance for two color temperatures. For improved dynamic range, it has an automatic knee circuit. The iris is also automatic, with variable peak/average ratio.

Signal to noise ratio in the AK-30 is a super-low noise condition of 62dB (typical in 6dB model) and standard gain of 58dB (typical in 0dB mode). With Y/IQ, NTSC and RGB outputs, this superb camera can prove its potential in just about any configuration, from broadcast stations to corporate studios.

To maximize the availability of information for the camera operator, the AK-30 has aural monitoring of incoming microphone, playback, and intercom. There is a warning tone for VTR malfunction.

Also built for flexibility, the AK-30 features a color negative reverse function for film use. A triax adapter is available as an option.

For further information contact: Panasonic, One Panasonic Way. Secaucus, NJ 07094.

Precision Speed Control

Cinematography Electronics announces the new Precision Speed Control for Arri Cameras. The Precision Speed Control can be set to any of 50,000 different crystal speeds, from 1.000 fps to 50.000 fps in .001 fps increments. These precision increments enable a film camera to synchronize to a computer or TV monitor without any special cabling.

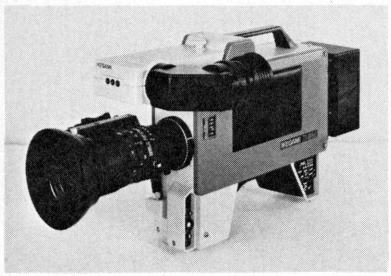
Set the five digit switches on the control to the exact scanning speed, start the camera, and move the scan line off the screen, by pushing the phase button. The crystal accuracy of the Precision Speed Control also allows it to be used for filming with HMI lamps at selected flicker free speeds. A low speed of 1.000 fps speed can now be achieved on Arri 35BL cameras, and 1.500 fps for most other cameras. The Precision Speed Control has a camera on/off switch and adjustable clamp for mounting. All electrical connections are made through a single connector which plugs into the camera accessory jack. Its small size, 4.3" x 3.6" x 3.0", and weight, 28 ounces, allows easy portability.

For more information contact: Cinematography Electronics, 16059 Temecula Street, Pacific Palisades, CA 90272 (213) 454-7351.

Plumbicon Pickup Tubes

The Ikegami low-cost, high-performance broadcast-quality portable ENG/EFP color-TV camera designed for

budget-conscious professionals is now available with Plumbicon® pickup tubes. Known as the Model ITC-730AP, the camera is intended for industrial users, TV stations and cable operators.



Based on a previously well-accepted Ikegami camera design, the new ITC-730AP has increased video gain of +9/+18 dB for a maximum sensitivity of 4 footcandles with an f/1.4 lens, and a signal-to-noise ratio of better than 55 dB. Center horizontal resolution exceeds 600 TV lines, with corners optimized by dyamic focus. Dynamic range has been expanded—without sacrificing resolution or S/N ratio in low-light image areas—by use of highlight compression circuitry.

The ITC-730AP has a lightweight camera (10.8 lb) and balanced weight distribution for long-term operation without operator fatigue. A rugged die-cast magnesium-alloy housing enables the camera to withstand rough usage common in ENG applications. Due to the very economical power consumption, up to three hours of operation from a Nicad battery may be obtained in the field.

In the EFP configuration, the camera head can be separated by 300 feet from the CCU using battery power at the camera head and up to 1000 feet using AC power at the CCU.

The ITC-730AP has been designed to be unusually easy to service and maintain. Camera tubes are readily accessible for replacement, and modular construction is employed throughout. A standard bayonet-type lens mount is used which permits lens interchangeability with Ikegami's ITC-350, ITC-730A, HL-79D and HL-95E cameras.

Complete specifications and further information are available from Ikegami Electronics (U.S.A.), Inc., 37 Brook Avenue, Maywood, N.J. 07607 or phone (201) 368-9171.

Dave Knox

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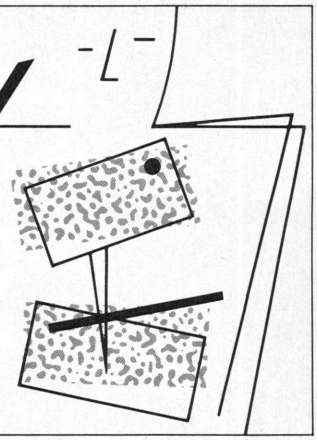

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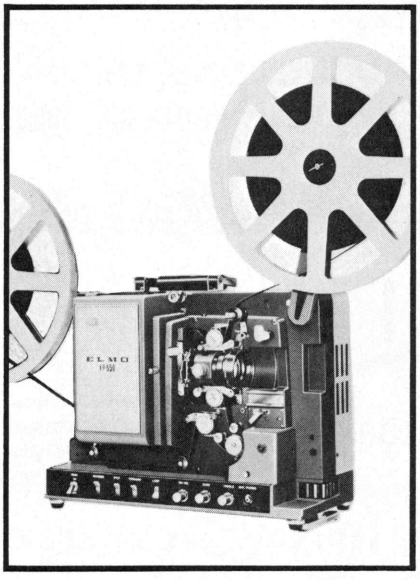

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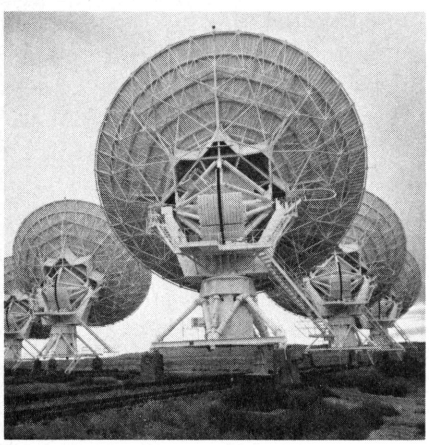

Very Large Array, near Datil. Photo by Mark Nohl.

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Calendar

January

Jan. 7–18, 1985
Optical Systems & Engineering
Tucson, AZ
Short Courses
P.O. Box 18667
Tucson, AZ 85731

Jan. 13–16, 1985
Pacific Telecommunications Council
Honolulu, HI
PTC '85: Toward a Digital World
1110 University Ave.
Honolulu, HI 96826

Jan. 16–21, 1985
ICIA Convention
Anaheim, CA
COMMTEX International
3150 Spring Street
Fairfax, VA 22031

Jan. 20–25, 1985
SPIE Symposium
Los Angeles, CA
Electro-Optical Engineering
P.O. Box 10
Bellingham, WA 98227

Jan. 22–30, 1985
Expocentr
Moscow, USSR
Telecine-Radio Techniques
Moscow, USSR, 107113
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February

Feb. 6, 1985
Academy of Motion Picture Arts & Sciences
Los Angeles
Academy Award nominations announced
8949 Wilshire Blvd.
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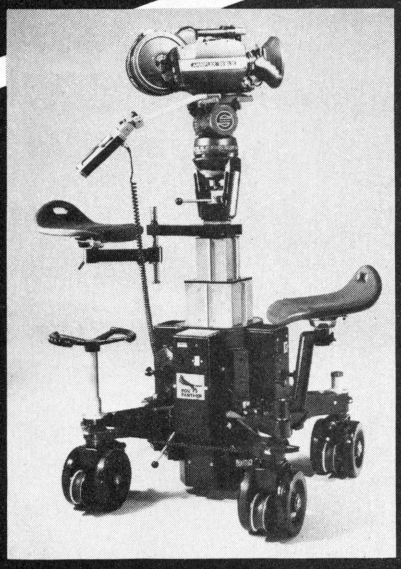

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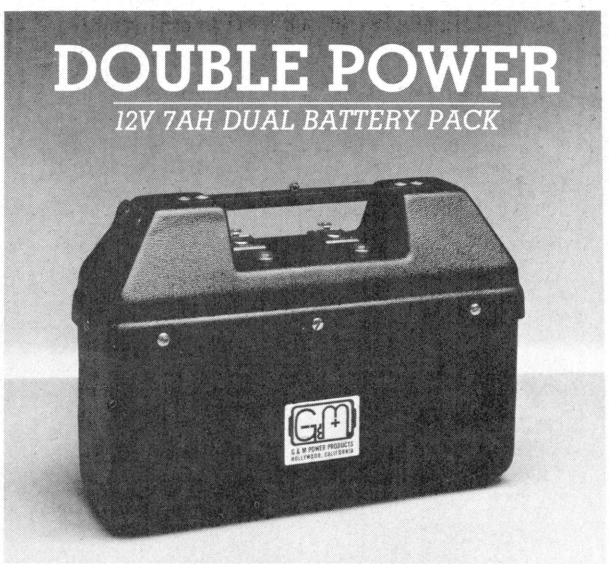

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19th Television Conference
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Feb. 19–25, 1985
SICOF '85
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Audiovisual Exhibit
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Milan, Italy Tel: 02/49.98.984

March

March 3–8, 1985
Audio Visual Institute
Bloomington, Ind.
Seminar
ICIA Training Dept.
3150 Spring St.
Fairfax VA 22031

March 17, 1985
Academy of Motion Picture Arts & Sciences
Scientific or Techincal Awards
Los Angeles
8949 Wilshire Blvd.
Beverly Hills, CA 90211 (213) 278-8990

March 17–20, 1985
Illuminating Engineering Society of North America
New York City
Symposium on Theater, Television and Film
Lighting (Show Light '85)
133 West 19th Street
New York, NY 10011 (914) 937-1300

March 25, 1985
Academy of Motion Picture Arts & Sciences
Los Angeles
57th Annual Academy Awards Presentation
8949 Wilshire Blvd.
Beverly Hills, CA 90211

April

Apr. 14–18, 1985
National Computer Graphics Assn.
Dallas, Tex.
Computer Graphics '85
8401 Arlington Blvd., Suite 601
Fairfax, VA 22031

May

May 12–16, 1985
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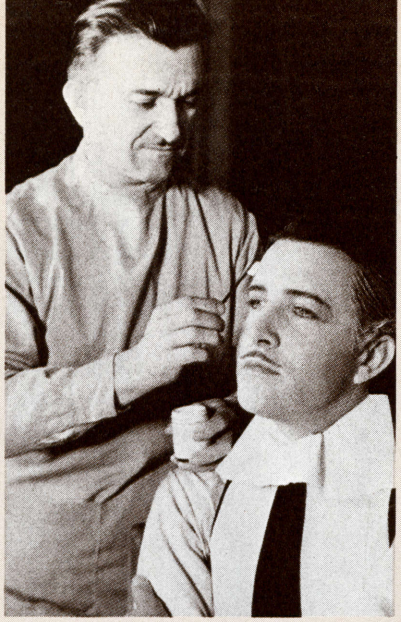


Pierce with John Boles, 1930.

"Jack Pierce?" The clerk at the Academy of Motion Picture Arts and Sciences' Margaret Herrick Library asked with a quizzical expression, "I don't think we have a file on him. What did he do?"

Advised that he was a make-up artist, the lady retorted, "I *know* we don't have anything on him. What were his credits?"

Nothing much, *Frankenstein, The Bride of Frankenstein, The Old Dark House, Son of Frankenstein, The Mummy . . .*"

"Oh."

A ten minute search produced a nearly empty envelope with the name Jack Pierce typed on the front. It contained two obituary clippings from the trades, one dated July 23, 1968, the other July 25th. The entire career of a movie genius was tersely summed up in eight inches of repetitious biographical information. By contrast, two of Pierce's subjects, Boris Karloff and Bela Lugosi, spilled over into several thick envelopes.

The Universal Studios Research Library had a better file, but it continued little that was new, mostly faded news clippings from the 1930's and more obituary material. "We don't have much," the librarian admitted, "He left here a long time ago, about 1945, I think. I wish we had more. He was a very interesting man."

At the offices of the Make-up Artists and Hair Stylists, the story was the same. "Of course we knew what he had done," Howard Smit, the business agent said, "but I don't know of anyone who worked with him who isn't dead now. He wasn't an easy person for anyone to know."

Following the fading trail of the legendary movie figure continued for almost two decades. It had all started in 1968 while I was a publicist at Universal. Not knowing the history of his abrupt departure, I called and tried to set up an interview with Jack Pierce.

All went well until I mentioned I *worked* for Universal. That ended our conversation. He could hold a grudge and he was stubborn.

Six months later I joined 23 other mourners trying to fill two rows of pews at his funeral. It was a hot day and the minister tried to eulogize a man he knew almost nothing about. Wandering from thought to thought, the preacher sputtered prayers and scriptures until he could keep up the charade no longer and sat down. Three make-up artists attended, plus several people from the fringes of make-up who made monster masks based on *Frankenstein* and other Pierce triumphs. It was pathetic.

Pierce wasn't singled out for obscurity, it was just the way Hollywood treated most of its founding fathers and patron saints. They weren't missed when they were alive, and still fewer missed them when they were gone.

The historian in me refused to let the story end with a bleak funeral and I continued my quest until I reached Boris Karloff. Like his former make-up man, the star was in the twilight years of his career. He was in Hollywood for a short time making a film called *Targets* and consented to be interviewed about his days with Pierce and the creation of *Frankenstein.*

A worshipper of the actor from afar, I was eager for a chance to meet and interview one of the most famous film stars of all time. I am sure that for his part, Karloff was less than eager to submit to *another* interview, but gracious man that he was, he consented.

From my interview, I came to realize *Frankenstein* was a film born out of desperation, created by immigrants who were all trying to remain in the film business at a time when the general economic climate was decidedly against them.

"Uncle" Carl Laemmle, head of Universal, had reached a point in production that required money, and fast. The studio, despite the success of *All Quiet on the Western Front,* was struggling to stay out of the hands of bankers and other financial interests.

Carl Junior, who *loved* horror movies, sold his father on *Dracula* and then convinced the elder Laemmle that *Frankenstein* would be another good bet. A former haberdasher from Germany via Oshkosh, Wisconsin, Carl Laemmle, having no desire to go

Jacques Lerner in a Jack Pierce make-up for Fox's* The Monkey Talks *(1927).

back to selling clothes, agreed to the adventure into horror films.

The director selected, James Whale, was from England where he had had great success with stage plays. After coming to Hollywood he was the dialogue director for *Hell's Angels,* then directed the film version of his hit play, *Journey's End.* None of this had yet provided him with the kind of reputation he needed in Hollywood to obtain *steady* employment.

Junior Laemmle had asked Bela Lugosi to screen test for the part, but the latter failed in his attempts to bring shivers to the spines of studio executives. Exit immigrant number one.

Karloff was enjoying a brief employment as a murderer in a Universal picture titled *Graft.* Whale noticed the distinguished-looking actor and invited him to test for the part of the Monster. Work in Hollywood was scarce, and Karloff freely admitted later that the discovery that his face would be almost wholly covered with the yet-to-be-designed makeup gave him only a moment's pause as he eagerly assented to the proffered screen test.

In later interviews, Whale cited the "strong facial structure" of Karloff as the reason for his initial interest in the actor. The fact was, however, that Whale himself was quite insecure. In England, where he had been an important stage director, his abilities were known and appreciated. On coming to Hollywood to work in films, things were different.

When Whale, "the most important director on the lot," as Karloff styled him, embarked on his *Frankenstein* project, he was clearly in need of emotional "props" and he sought them in the form of fellow British expatriates such as Karloff, Colin Clive, and, later, Elsa Lanchester and many others.

Hence the fact that Karloff was chosen to try for the role likely came about as much from the fact he was English as from the fact he had started to build a strong reputation for himself as a "heavy" in gangster films and had "strong facial structure."

With the promise of a screen test, Karloff fairly floated to the studio make-up department where he met Jack Pierce for the first time. A small, wiry man with a quixotic imagination and a sometimes sharp-edged temper, Jack P. Pierce was an immigrant from Athens, Greece who had spent two decades working his way upward in the film business to his present position of head of the Universal make-up department.

His job was reasonably secure, but he longed for authority over actors that would allow his latent abilities as a technical artist full expression. He was still smarting over the rebuff he had received at the hands of Bela Lugosi, first in *Dracula,* where he had suggested some dramatic additions to the star's face for the role, and later for the *Frankenstein* screen test.

Part of the difficulty between Pierce and Lugosi stemmed from the star's aversion to have anything other than a light coat of grease-paint on his handsome features. He did allow Pierce to blend a special light green tone for *Dracula* which, when photographed in black and white, gave a ghoulish pallor to the Vampire's visage.

With the screen test for *Frankenstein,* Pierce had elaborate suggestions for the Monster's

Conrad Viedt in Pierce's make-up for* The Man Who Laughs *(1928), with Mary Philbin.

makeup, and again he was given a prompt "no" by Lugosi. By the time Karloff appeared, ready to submit to anything in an effort to get the role, Pierce was in a complete temper fit.

There seemed to be an immediate bond between the two men which partially centered around the fact they were both immigrants. But there was another element. Karloff was pliable and anxious for Pierce to *help* him. This attitude put the make-up man in the driver's seat.

That was all that was needed for something remarkable to transpire.

A life-long friendship and it might be said, mutual admiration society was formed before the actual design work on the Monster even started.

Despite the fact it was the movie Monster that brought the principal characters in the *Frankenstein* saga together, it is likely it would have become another Universal "pot-boiler" if each person had not possessed the insight and motivation needed to make the film a genuine classic of Gothic terror.

Whale was using British actors to tell an English Gothic tale, struggling as he did so to create his own screen technique and interpretation that would take him on to more serious projects; Karloff was trying to stay employed and was eager to be the Monster. Pierce for his part was waiting for a chance to prove his abilities as a visual artist with make-up and ingenuity. Junior Laemmle was excited at the prospect of giving birth to yet another horror film in the tradition of his successful *Dracula* and his father, "Uncle Carl" was looking for a quick fix for his financial troubles.

During the tedium of creation, as Pierce tried first one idea, then another, searching for the combination that would bring his vision of the *Frankenstein* creature to life, there was plenty of opportunity for the two men to discuss a variety of subjects. But one that received scant attention, was the past history of Pierce.

Aside from a few sketchy details, such as Pierce starting his career in a movie projection booth about 1910, and that he had been a professional baseball player and later a film actor in silents, there was little new information.

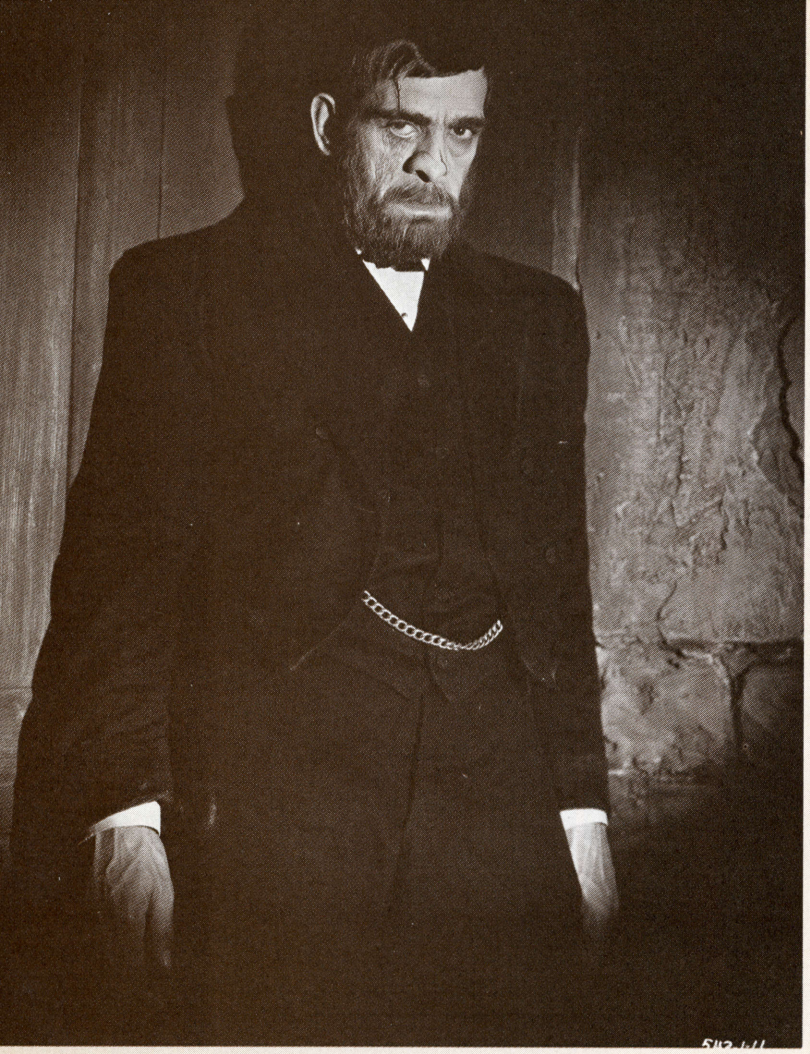
Pierce was respected at Universal as a professional who could handle anything the studio could toss in his lap, but his reputation among others in his craft was slight. He didn't work at the great movie factory, MGM, where the reigning "kings of make-up" were ensconced. Instead, he was head of a tiny department at a second class studio.

Even at Universal where he was respected, there was a thorn in his professional side – Lon Chaney, the legendary "Man of a Thousand Faces." Even though the star was dead, his glittering reputation still hung over Pierce like a shroud. Everything Pierce did was compared to what Chaney might have done in the same situation. How close this relationship between Chaney and Pierce was can be gleamed from an interview I conducted with Joe Rock, an independent producer at Universal during the early 1930's.

Pierce's most famous creation: Karloff as the monster in* Frankenstein *(1931).

Rock won an Academy Award for his documentary, *Krakatoa* and was very popular on the Universal lot. He was also a member of the studio basketball team which was sponsored by Junior Laemmle and coached by Pierce.

If Pierce had a hobby, apparently it was the team, for a number of photos survive that show



Karloff via Pierce in* The Old Dark House *(1932).

him posing with the various groups, those that traveled out of town as well as the local matches. Because they were so friendly on the courts, Rock came to know Pierce very well. "He was the most wonderful man in the whole world, what more can I say?" the retired film executive asked.

As the interview progressed, something popped out that created a fresh mystery about Jack Pierce. "I know he was working on special make-up for Lon Chaney," Rock mentioned one day, "that I know for sure." Chaney was a very secretive person, especially when it came to various techniques he used in his film roles. He once made the statement, later confirmed by his son, Lon, Jr., "I will take most of my make-up secrets to my grave." He insisted on doing his own make-up, even in his early career when no one knew the amazing talents he possessed, so why at the height of his career, before his tragic death, would he turn to Jack Pierce?

Rock had no answer. "All I know is it was special make-up just for Chaney. Jack was very proud of himself for being involved with it."

Try as he might, Rock has been unable to fill in any more details on this sidelight of Pierce and Chaney. Possibly Pierce was bragging about his abilities as a make-up artist in front of his friends, where he could be sure of not being questioned as to specifics. Or was he really working on some unusual makeup creation that required his special talents? Unless further information comes to light, we will never have an answer.

One thing that does seem clear from later events was Pierce's determination to do something with the *Frankenstein* Monster that would eclipse the previous triumphs of his former competitor. So a new element enters the development of a Frankenstein monster, professional ego.

Karloff would have been oblivious to the overtones present at the creation of his makeup. He did say that Pierce was a studio "insider" and because of this position, he was able to stall requests for the screen test a number of times, thus preventing its premature exposure to Whale, or the Laemmles.

Thanks to the rapport that blossomed between the two men, no trace of Pierce's temper fits and abrupt, austere manner was evident during the long sessions required to fashion the Monster's makeup. Had it been the other way, chances are good the Monster would not have become the spectacular success it was.

"He was nothing short of a genius, besides being a lovely man," Karloff said once. Karloff had long felt he had never been given a role that allowed him to use his acting talents to the fullest. Pierce on the other hand felt the sting of rejection frequently when he tried to consult with the Universal roster of stars since he was "only" a make-up man. Now the two men faced each other, probably realizing in some subconcious way, their moment had come.

What would the Monster look like?

Time and time again this question had surfaced, only to go unanswered. When he was first suggested for the role, Karloff had purchased a copy of Mary W. Shelley's novel and read the description of the creature that emerged from Dr. Frankenstein's laboratory. He quickly realized, as Pierce had before him, there was no explanation in the book that could help them.

The fact that Mrs. Shelley didn't go into detail about the Monster was probably a key element in the drama now taking place in the Universal make-up department. Since no literary blueprint had

Frederick Peters and Bela Lugosi in* White Zombie, *with make-up by Pierce and Carl Axcelle.

been prepared by the author, Pierce with suggestions from Karloff would be free to let their imaginations go wild. This was an opportunity that might never come again and Pierce was ready to seize the moment.

In the half-century since *Frankenstein* appeared on the screen, no dichotomy has erupted over the interpretation. In one final, bold stroke, Pierce gave the world the *definitive* expression of a freak that had slumbered in the imaginations of men for more than a century.

A cloak of secrecy was thrown over all aspects of the *Frankenstein* project. Pierce and Karloff kept their counsel until the screen test. Universal kept prying eyes away from the set until the movie was completed, then refused to talk about it until its official preview screenings which set Hollywood and later the rest of the country buzzing with excitement.

Like his literary counterpart, Frankenstein, Pierce and his co-conspirator created their version of the Monster piece by piece in a midnight laboratory – an old dressing room far from the prying eyes of studio executives. For Pierce, the idea of working furtively was appealing; he wasn't anxious to let anyone, even assistants share in his "trade secrets." In this he was much like Chaney. Both men felt their collected wisdom shouldn't be shared, only exploited by themselves.

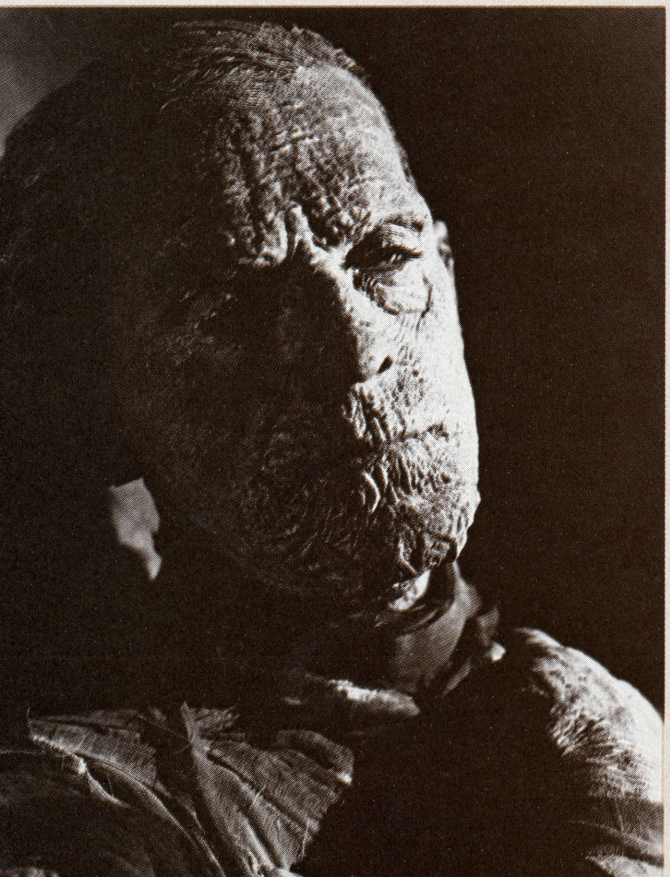
In the late 1930's when the issue of *Frankenstein* had become a somewhat tiresome theme and the public had real monsters to worry about, Pierce gave an interview in which he described the many months he had spent researching the creature he was going to bring to life with make-up. All of this begins to sound a bit odd however, since Karloff said in oft-repeated interviews about the original articulation of the makeup that he would leave the set of *Graft* at the end of the day's shooting and go to the place where Pierce was waiting. After bolting down a quick sandwich and cup of coffee, and having a last cigarette, Karloff would settle down in the barber chair for the night's work.

Karloff at Pierce's mercy in dressing room no. 5 during* Bride of Frankenstein *(1935).

During this period, the studio production office would call repeatedly asking if the project were done so that the screen test could be made and each time Pierce would deftly shunt them aside. "No, not ready yet."

When asked if they had worked on the concept and manufacture of the Monster's face for months, Karloff responded: "Heaven's no! We were working like fiends (chuckle) to get it done before someone changed their mind and we lost the opportunity completely."

The make-up fabrication did take a long time, but not months as Pierce liked to say. That the face that emerged at last from the make-up lab was immortal, no one can dispute. From the flat-topped dome, to the scars and neck plugs (which left permanent scars on the actor's neck), everything was perfection.



Pierce's favorite make-up: Karloff as* The Mummy *(1933).

In one of his few interviews, Pierce explained that he had consulted a medical book that said there were six possible ways to cut open the human skull, he elected to use the simplest one, a straight cut

***Elsa Lanchester and Karloff in* Bride of Frankenstein.**

that removed the whole top of the head. With this procedure, Dr. Frankenstein could plop in a new brain, snap the "lid" on with metal clamps and his creature was ready for an infusion of lightning.

To make the squared-off skull contour, Pierce literally built a new head on Karloff with layers of cotton and alternating applications of collodion, (a flammable chemical which denied Karloff the pleasure of smoking while the work progressed).

Karloff admitted he lost track of the number of hours he submitted to the physically draining experience of sitting riveted to the seat of the make-up chair, almost motionless as the whole weary process ground on. "After a hard day's shooting on *Graft* I would spend another six or seven hours with Jack, then return bright and early for the next day's shooting. More than once I wondered if my patience would be rewarded with a contract to play the Monster."

In that pioneering era of motion picture production, there was no way known to cut short the process that Pierce used to make the Monster's face. Karloff would stop short of saying that the makeup was painful, in deference to his friend's feelings, but it was. He was just too much of a gentleman to reveal the full extent of the misery he suffered.

In common with other craftsmen of his day, Pierce was using materials that wouldn't have been out of place on the shelf of a medieval alchemist's den. A few had been used in stage make-up for years. Despite their crude nature, Pierce was a master at blending them and making an illusion so perfect, the all-seeing eye of the camera couldn't spoil the effect by revealing flaws.

The heavy, drowsy eyelids that gave the Creature a half-alive look that audiences loved, were first made out of wax and attached to the actor's own. Later these were replaced with false lids made of rubber. In the 1939 *Son of Frankenstein* a rubber dome was made, but there were few other short-cuts during the many months various *Frankenstein* sequels were in production. Everything was hand-made in the truest sense of the word.

For the pallor of death, Pierce revived one of his ideas for *Dracula* and mixed a special grease-paint which photographed grey on the screen.

Hand-painted applications of fresh scars, careful shadow definitions, coarse, matted hair and other theatrical touches brought the living corpse fresh screen impact. The towering size of Dr. Frankenstein's Monster was accomplished by the manufacture of special shoes (weighing 30-pounds each) while his legs were encased in metal struts that wouldn't allow the knees to bend. Two pairs of trousers were then added to pad out the figure.

Pierce shortened his friend's coat sleeves to make his arms look longer and black shoe polish was added to the finger tips to make it look as though blood had collected and dried in those extremities. Added together, the touches of scientific fantasy and showmanship gave the Monster a foreboding presence.

Once the Monster was finished and Karloff was officially cast in the role, the worst part of the ordeal began for the star. He was packing 60-pounds of costume, struts, shoes and miscellaneous accouterments, plus make-up that was uncomfortable at best, and miserable under certain conditions.

Under the blazing outdoor sun on location or in the sweltering, overheated sound stages, ten, twelve, sometimes fourteen-hours per day, he struggled on. It seemed at times that Whale had a vengeance against the Monster that he was taking out on Karloff. Time after time, the director demanded that the actor carry a limp Colin Clive up the hill to the old mill.

Loath to refuse, Karloff did as he was asked, but the strain on his back sent him to the hospital shortly afterward for a fusion. Karloff never felt that Whale was trying to punish him *personally,* but he frequently was sure the Monster was being punished by the British director, and he started to resent the treatment.

The final hours of torment came at the close of shooting each day when the Monster's face had to be removed. This session usually lasted 1½ to two hours and was fraught with more misery as the applications of cotton, grease-paint and collodion were dissolved with powerful chemicals. The plaster used on his hands and wrists would remove Karloff's body hairs, adding to the discomfort.

Bits of the make-up fell into his eyes, adding to his list of film-related injuries. More than three years later, tiny white scars remained on Karloff's chest where bits of hot carbon from the movie lightning had rained down on him during the scene where he was brought to life by Frankenstein. Laemmle Jr. had said, "Karloff's eyes mirrored the suffering we needed." For the thespian's part, not all of the suffering that delighted Whale and Laemmle was acting.

That the total *Frankenstein* experience left deep scars on his psyche was evident during our short interview, when the aging star would pause and shudder slightly at some of his recollections.

By the time Karloff and Pierce were reunited for *Son of Frankenstein,* eight years later, the make-up man had refined some of his techniques with substances described as "plastics," but the total ordeal was hardly shortened.

The Mummy, produced in 1932, teamed Pierce and Karloff again and the result was another triumph of technical skill and visual artistry. But if Karloff thought he was to get a respite from the rough physical treatment he had endured in *Frankenstein,* he was in for a shock.

The mummy wrappings developed for this picture consisted of linen that had been boiled until it literally fell apart in Pierce's hands as he applied the strips of cloth. Karloff's disguise required layers in three directions, (horizontal, vertical and diagonal) to cover his bare skin and Pierce had a tough time of it.

Henry Hull a'la Pierce in* Werewolf of London *(1935).

After the wrapping was completed, a thin coat of clay was applied. Next came glue. The face and hands received a brilliant application of Pierce's best makeup art. Cotton was stuck to the actor's face and hands with adhesive, with the extra bits of the former removed with tweezers. This gave the skin surface an irregular effect. Next came an application of grease-paint that gave the cotton a tone that matched the bandages. A dark brown pencil line was used for final accentuation and modeling under the "brute" lights.

As the cotton dried, it tended to wrinkle the actor's own face, high lighting the total effect. Next Karloff's legs were bound together and bits of rice paper were fastened to his eyelids. A small slit was

cut in this for vision and the opening was accented with a grease-paint pencil to make it look as if the eye was half-opened.

The actor's own thick hair was painted with grease-paint of a neutral color, then Fuller's earth (used in paint manufacture) and beauty clay were mixed in. The effect was terrifying to audiences of the early 1930's who had been unused to such realistic special effects in horror films.

When the mummy began to breathe and stir ending a centuries-long slumber, the wrappings burst from the surface stress and tension provided by the glue, and a light cloud of dust floated in the air.

It was one of Pierce's best efforts.

But time was his enemy. This make-up took *eight hours* plus another two hours to remove.

Slicing *ten hours* out of a shooting day doesn't leave much for the actor or the production company to work with. For Pierce, there was no *easy* way. Everything he attempted was done the hard way since he had learned his craft that way and it was too late to change. The results were incredible, but modern film schedules and soaring production costs were pushing his genius aside.

Bela Lugosi saw film roles fading and demands for his services in important films diminishing. When he was cast as Ygor, a criminal in *Son of Frankenstein,* the Hungarian actor came to Pierce and asked for help in reviving his faded career.

If Pierce held a grudge, he didn't show it. He promptly made a rubber neck for Lugosi that simulated the broken one the script called for, and then fashioned the rest of the make-up with yak hair. The star meekly submitted to this ordeal, (which was a good way to describe the four hour make-up application). Gone were the days when Pierce was allowed to mix grease-paint for the actor and nothing else.

Karloff and Lugosi—the monster and Ygor—in* Son of Frankenstein *(1938).

But, like Karloff, under the makeup, Lugosi came "alive" in the role and his superior acting and voice inflections proved once again he was a major film personality.

If Pierce saw the handwriting on the wall, it wasn't apparent. With Karloff gone, Pierce and Universal entered the 1940's with Bela Lugosi and Lon Chaney Jr. in their horror film ranks. By this time, Pierce should have been in professional heaven. He had exorcised the ghost of Lon Chaney Sr.; now studio heads and his peers in make-up pointed to his accomplishments as benchmarks of perfection.

Universal needed a new monster. Boris Karloff had made it plain that he was not coming back to do the monster under any circumstances, feeling there was nothing more he could do with the role. Enter *The Wolfman.*

Lon Chaney Jr. was a large man, imposing in size with strong features. He was the ideal vehicle for a menacing film freak. Working with Chaney as he had done with Karloff, Pierce devised a wolf face that would, like his other creations, become a classic horror personality.

Making a rubber snout, Pierce applied hair to the actor's face in a laborious process that sometimes consumed 16 or more hours. A transformation could take up to 22 hours. While studio heads watched the clock tick off the hours,Pierce would go about his painstaking makeup procedures.

The effect on the screen was marvelous, but the manufacture of the effect pushed the costs of the low-budget features even higher. Pierce was unsympathetic to the virtual log jams he was making in the film output of Universal. Perfection was his goal. To demands that he speed things up, he seemed to be saying "Let them eat pancake."

One of the most effective parts of the 1941 *Wolfman* was the on-camera transformation of Chaney into the werewolf. The process involved careful cooperation between the cinematographer (John P. Fulton, ASC) and Pierce, plus a number of other departments to successfully pull off.

A set would be constructed, such as a window with the moonlight pouring through. Chaney would stare at the moon as he slowly metamorphosized into his monster role. Nothing could move during this process to reveal the stop motion tricks of the camera operator. The background curtains would be starched, Chaney would hold himself rigid, and the camera itself would be weighted to prevent vibration.

As Chaney gazed toward the sky, Pierce would start by putting a few hairs in place on the actor's face and hands. The camera would roll, more hair would be added and so on. When the time came for a new nose on Chaney, everything would stop, a glass

plate would be swung into place next to Chaney's head and his outline drawn on it.

Retiring to his lab, Pierce would complete the makeup and return Chaney to the set. He would be re-positioned against the glass outline, and the sequence finished. Between Chaney's drinking problems and Pierce's slow make-up applications, nearly a full 24-hour period would drain away – more if Chaney grew impatient and ripped the make-up off mid-way in the shooting.

By 1945, no one at Universal could justify the combination of a prima donna make-up man *and* star.

Universal was not making works of art, they were making "B" movies that had a short shelf life (or so they thought at the time), and speed, low costs and simplicity were their gods. Aging, slower than ever, more demands in his requests for time to do his work, Pierce was shown the door in 1945 after *The House of Dracula*, another pot-boiler thriller.

The war had ended; younger men, eager for work were clamoring for a chance. Trained in the use of latex and techniques developed by the medical profession to help injured veterans, they pushed their way into the studios with fresh ideas and an urgency unknown before. The truth was plain. There was no longer a place for legends, no matter how great. The film business was going to move forward with younger talent, men and women anxious to prove their skills and talents.

Stubborn to the end, refusing to compromise or use cost-cutting techniques, Pierce was let out after 22 years of devoted, brilliant service. When told that the make-up quality would suffer, a studio executive said, almost with a sneer, "So the make-up isn't perfect. People are still buying tickets; that's all that counts in this business."

Pierce free-lanced at the old Hal Roach Studios for a time, and did some amazing make-up on the TV show "You Are There." But the glory days were over. The slow decline was one of infinite emotional pain for Pierce, because he still lived in the shadow of Universal, the site of his early screen triumphs. He could watch the work of younger men like John Chambers (who won an Oscar for another science fiction classic, *Planet of the Apes*, the same year Pierce died) and ruminate on the vicissitudes of fate. No film societies clamored for his lectures, no star was cast on Hollywood Blvd., he wasn't searched out for interviews; his eclipse was complete.

Almost 16 years after his departure from this world, no books have been written about his accomplishment, although his is mentioned prominently in a number of reference works. There is little to remind the world that he was once the greatest horror make-up man Hollywood had ever seen. A tribute of sorts is still found to his special genius each time one of his monsters is flashed on a screen, so his memory in that respect is maintained in perpetuity.

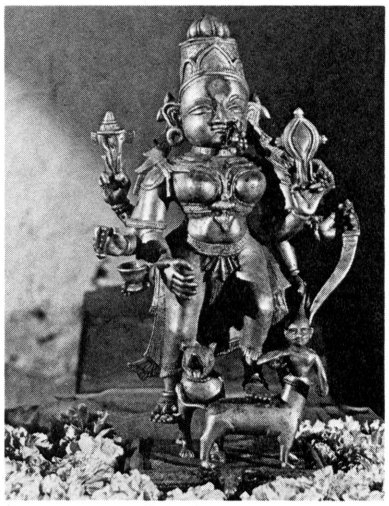
Jack P. Pierce may have taken inordinate amounts of time to create his make-up with the crudest of old-fashioned materials – but no one ever did it better. He was one of a kind. ■

Lon Chaney Jr. gets the works for* Frankenstein Meets the Wolf Man *(1943).

Glenn Strange was the last Pierce Frankenstein monster in* House of Frankenstein *(1944) and* House of Dracula *(1945).

Prem Vaidya, MBKS

Recreating a Life on Film:



During the British-India days, "an Indian revolutionary, Vinayak Damodar Savarkar jumped out of the British ship at Marseilles in France." We children were thrilled when we read this in the national papers. Savarkar became our hero!

Years rolled by. A note came to my table in November 1977, "You are assigned 'Veer Savarkar' documentary film. Prepare a research paper and submit." I was surprised. I knew nothing about Savarkar except his Epic Leap of Liberty.

"You have a good subject," the first person to compliment me was my colleague Prabhakar Pendharkar and he started reciting a couplet written by Savarkar on his commitment for the freedom struggle:

"It was not the vow taken in blindness,
Vast history was there for your kindness.
Burning hearts of multitude was the force,
Which compelled me to take this course."

My search began, but experience with this film was peculiar. Instead of my going to people, they started coming to help me. A friend of mine took me to "Savarkar Sadan" in Bombay where Savarkar lived. I was introduced to Balarao, a private secretary to Savarkar during his last 15 years. Balarao showed me piles of newspaper cuttings, books, photographs, paintings and narrated his own personal experience with the great patriot.

There was no film material available on Savarkar except on his funeral procession!

My next meeting was with Dhananjay Keer, an eminent biographer and research scholar. Keer had compiled biographies of two diverse characters, Veer Savarkar and Mahatma Gandhi. These books were widely acclaimed. The book on Savarkar became my constant companion.

I submitted a 70-page research paper on Veer Savarkar and within a week approval came asking me to write the script. Savarkar, Savarkar, Savarkar, I could visualize nothing but Savarkar!

Then came a jolt. I was asked to stop all work on the Savarkar documentary and go for another assignment, filming, *Ocean To Sky* along with Sir Edmund Hillary. It was an expedition with 19 members on three jet boats from Gangasagar in Bengal to Gomukh in the Himalayas on the river Ganga lasting for 76 days, all against the current. While reading Savarkar literature, I had imagined the difficulties in "going against the current" and now I was experiencing hurdles all around.

After the successful filming of the expedition, I was sent to London B.B.C. for training in television and documentary filmmaking. Though there was no move on the Savarkar documentary, I thought it was an opportunity to see places connected with Savarkar: India House (Bharat Bhavan), Gray's Inn, Caxton Hall, Imperial Institute, Brixton Prison, Pentonville Prison, Bow Street Court, India Office Library and Records and the British Museum Library.

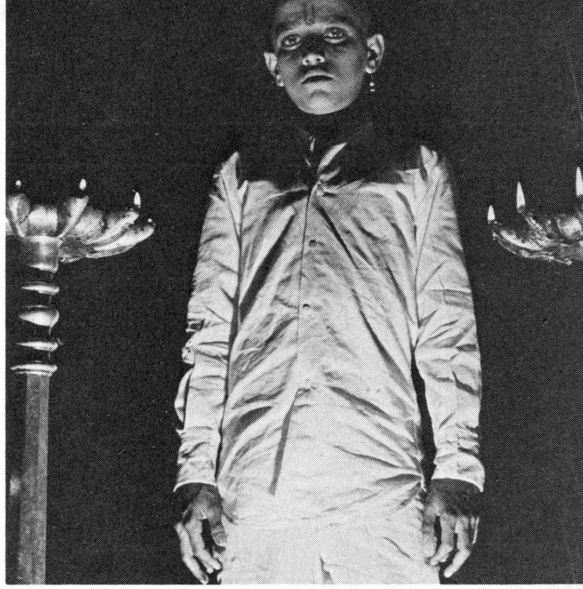
Now every evening and on weekends my destination was India House at 65 Cromwell Avenue, Highgate, London. Like a crazy man I roamed this three-storied building.

It was India House which was bought by an Indian patriot Shaymji Krishna Varma in 1904. The House became a focal point for the Indian freedom movement in London and also the place for Indian cultural activities. Many Indian student patriots were housed here. It was in this House that the birthdays of Indian national leaders like Shivaji and Guru Govind Singh were celebrated. It was here that revolutionary Senapati Bapat and others learned to prepare bombs. It was in this House that the first flag of independent India was made in 1907 by Savarkar and Hemchandra Das and was unfurled by Madam B.R. Cama at Stuttgart, Germany.

It was here that Savarkar wrote books on Mazzini, the Italian freedom fighter, "The History of Sikhs" and his famous, "The First Indian War of Independence—1857."

At Brighton, a sea resort, on a sandy beach, Savarkar had written a poem which expressed the longing of perhaps every revolutionary in exile—a poem in appeal to the great ocean to carry him back to the feet of his Motherland. Photographs taken of this

Veer Savarkar



Young Savarkar, between the two brass lamps at midnight, looks to the goddess Durga (opposite) for guidance.

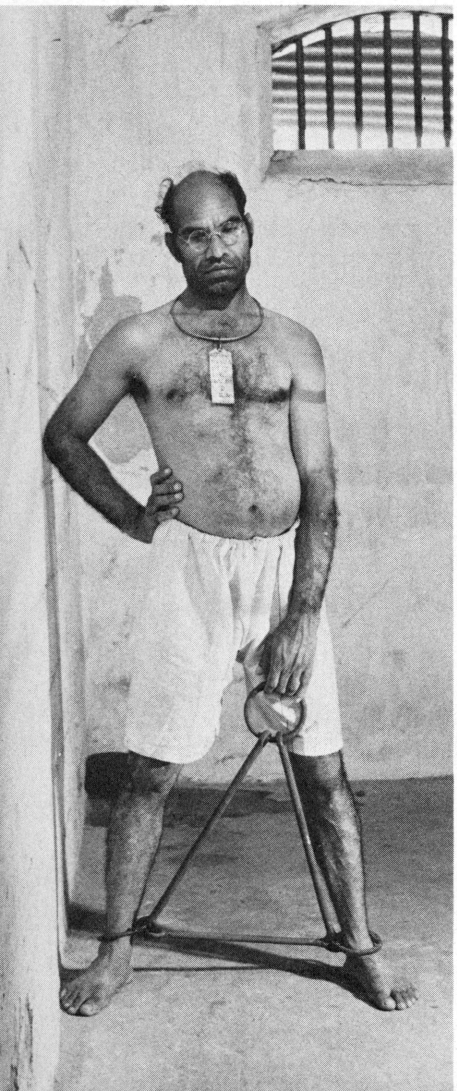
place were also used in the film along with the same poem sung by Sudhir Phadke in his melodious voice.

In London, I went to the British Museum Newspapers Library at Colindale. I asked the librarian at the counter if I could get old newspapers.

"How old?"

"From 1857 onwards."

Placing his hand on my shoulder the librarian said, "We don't consider 1857 as old. Even the newspapers of 16th century are not old with us!"



Delightedly I placed my list of requirements from 1857 to 1947. Within 30 minutes a trolley came loaded with well bound old papers and a few magazines. All this with courtesy. I thanked the librarian. For the next seven days my address was the British Museum Newspaper Library at Colindale!

In August 1982, we assembled on our studio premises for the Independence Day flag hoisting ceremony. After the function was over, our chief producer, N.S. Thapa informed me to start shooting on "Veer Savarkar."

The search for someone to play the role of Savarkar began. Disappointed on all fronts, it was decided to complete the film by using someone's shadow. One after another unit members came with their tour papers. One day David Kasbe came with his papers. He was standing against a lighted window. His profile was in silhouette. I was stunned, he looked exactly the same as I had seen in one of the photographs of Savarkar in Keer's book! Shape of nose, side locks, bald head, all were similar.

"Eureka! I have found him," I cried to myself. But before I made a final decision, it must be confirmed. On October 6th, our six-member unit—cameraman, M.S. Gangadhar; assistant cameraman, Santlal; consultant, Balarao; driver, David Kasbe; unit manager, Sharad Pethe and I started from Bombay for Bhagur, Nasik, Poona, Ratnagiri for location shooting. Balarao was sitting next to me. I casually pointed towards Kasbe and asked him, "how does he look?" Kasbe was at the steering wheel. His back was on our side and only part of his face was visible. At a glance, Balarao knew what I was asking about.

"Excellent, Savarkar looked almost the same," he said.

In Bhagur village, where Savarkar was born on May 28th, 1883, we had important sequences to be filmed. Balarao and myself had gone earlier to make preliminary arrangements and also to select "young Savarkar." We had approached the head master of Bhagur School and requested a young Savarkar. He ordered all the boys of age group of 12–15 to come in front of us. I asked the enthusiastic crowd, "Who would like to play the role of young Savarkar?" All hands went up.

"You will have to shave your head if selected."

All hands went down. In olden days, high cast Hindu boys used to keep only a tuft of hair on their shaven heads. We had to depict that period authentically.

One fragile, fair looking boy came forward. "I will shave my head, I will play the role of young Savarkar." A deep look at the boy gave me a strong feeling that Savarkar in his young days might have looked like this and might be speaking with same determination. As our bus entered Bhagur village, "young Savarkar"—Jaishankar Shahane was right in front to greet us. It was a great relief.

The birth of Savarkar was shown in his own house at Bhagur by a decorated cradle in the center

Savarkar in prison.

of the room. The next shot was of Savarkar's original horoscope in the cradle and then a zoom forward to the birth date on the horoscope—28th May 1883. Savarkar's going to school was shown with the help of tiny foot marks on the ground and on every foot mark we had placed a small flower. Gangadhar tilted the camera to show the row of foot marks leading to the school gate. On this shot I had used the sound track of first standard prayer song in the school. Again in the classroom we arranged writing—slates and chalks.

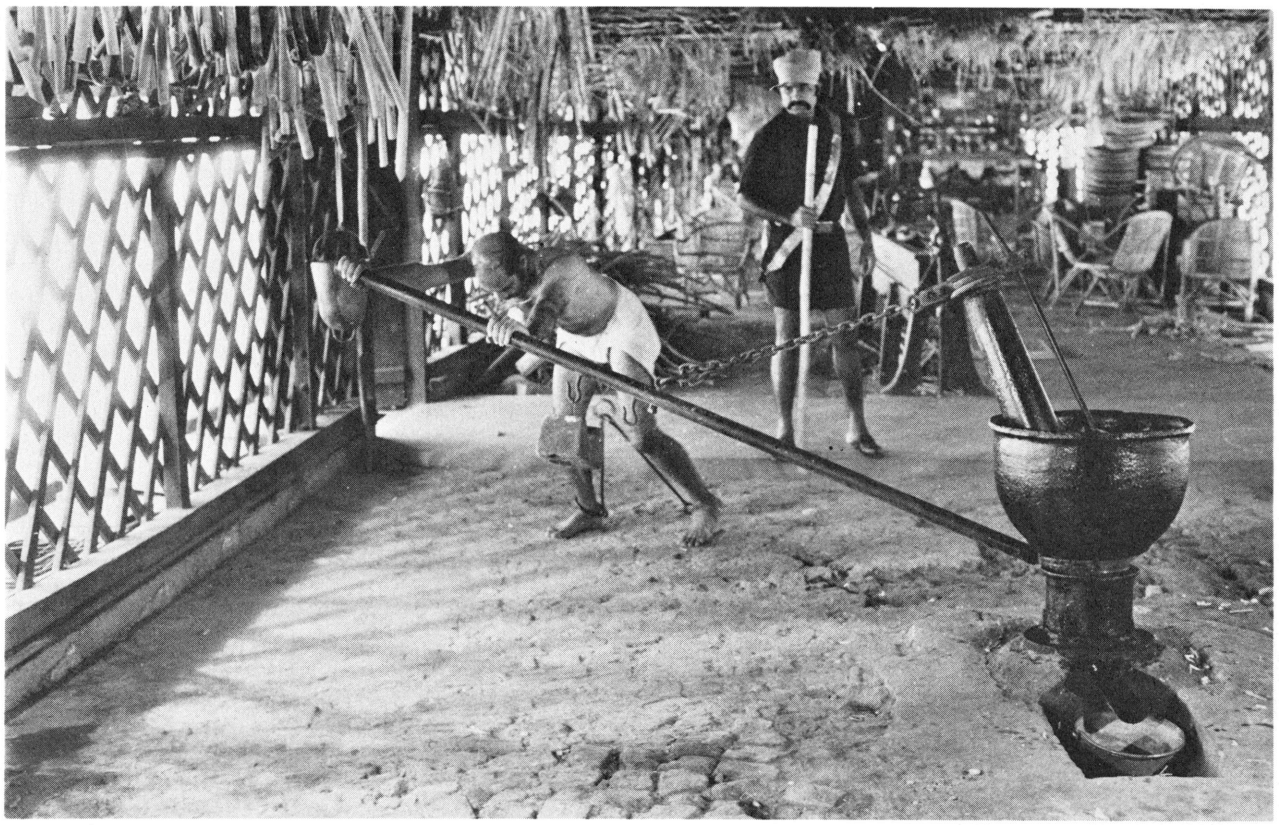
Gangadhar had a hard time filming the plague sequence of 1899. I had decided to use a dead rat symbolically in the center of the frame against a deserted village. But getting the dead rat correctly in the center was difficult in spite of a number of rehearsals. At last we decided to use a reverse motor and reverse the magazine on our Arriflex camera. We started the shot with the dead rat right in the center of the frame and then pulled it out. It worked. This shot was later connected with dead bodies, funeral processions, empty village streets, locked doors etc.

The next sequence was the oath taken by young Savarkar at midnight in front of the family deity—Goddess Durga. We had no generator with us nor could we use more than two sun guns because of limited power supply in the village house. Gangadhar kept the sun guns on the ground as a source light coming from two brass house-lamps. He did not allow any light to spread anywhere in the room. I placed the camera at a low angle and from total dark young Savarkar was shown coming in between the two brass lamps. With light from below and the low camera angle he looked terrific. With folded hands in front of Goddess Durga he took the oath: "I will fight till my death for the freedom of my country."

Jaishankar played the role so well that all of us present felt we were witnessing the real Savarkar in 1899! On the fourth day in the morning, the whole Bhagur village, including Jaishankar Shahane gave us a memorable send-off for our next location—Nasik, 10 miles from Bhagur.

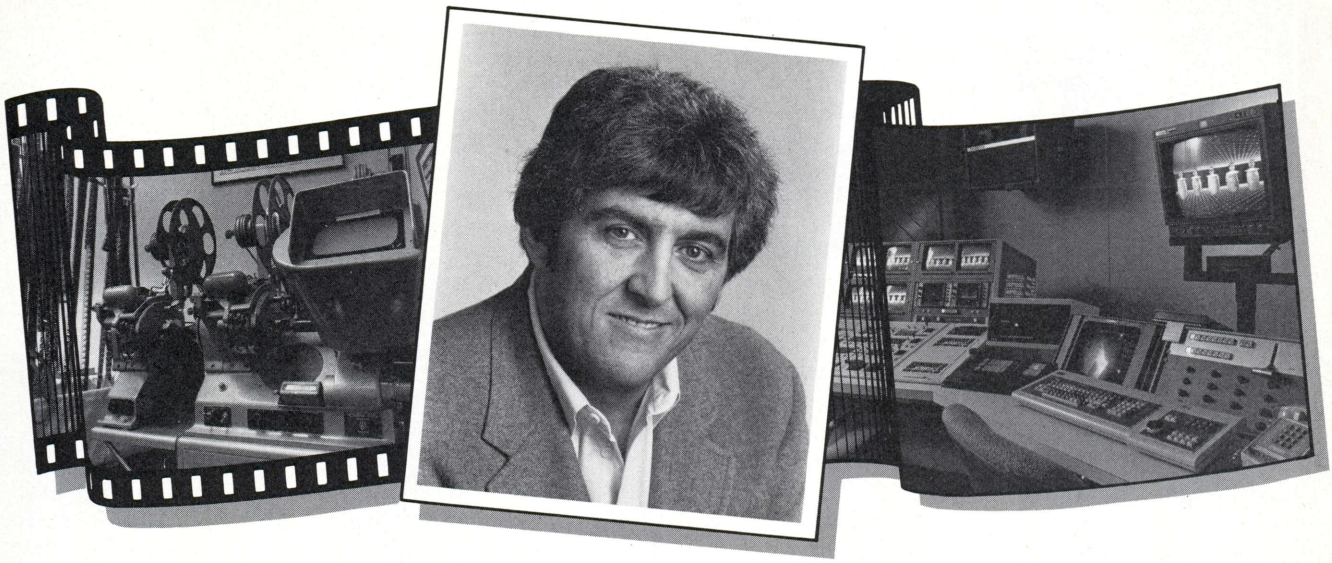
It was in Nasik that Savarkar received high school education and during school days he formed a revolutionary party—Abhinav Bharat, "Rejuvenated India." Since all the activities of this party were in secrecy and at night, we shot at night where revolutionary boys were surrounded by burning brass lamps.

Nasik was also the place where a British district collector, A.M.T. Jackson was killed in the theater while watching a stage play on the night of 21st December 1909. We had to re-enact the scene. While doing the other shooting we were searching for Jackson's head stone. It was a surprise to us that the people in Nasik had no correct information about him. Some said his dead body was taken to London and some said he was buried in Bombay. When we started cross checking, we found that his body was taken out of Nasik. Our search found the head stone in an old dilapidated Protes-



Savarkar bound to the yoke in the oil mill.

A NONCONFORMIST JUST REVOLUTIONIZED CONFORMING.



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We're On!

e arrival of varkar at the daman Islands is otographed by ngadhar.

tant cemetery with wild grass grown around. We started checking the head stones one after another. An old keeper of the graveyard came to our assistance.

"Are you searching for the collector?"

We nodded.

"It is there in that corner." He pointed towards it. We all rushed as if we had found a gold mine. We started clearing the grass around the slab. We could not read the letters properly as the slab had been exposed to the elements for the last 73 years. We cleaned the marble slab with water. The black color on engraved letters had disappeared. Cameraman Gangadhar picked up a ball point pen from Balarao's pocket, removed the refill and broke it to take out the black ink. He began coating the engraved letters with a grass stick. At last we were able to read: "Sacred to the memory of Arthur Mason Tippetts Jackson I.C.S. collector of Nasik. Born 30th December 1867. Assassinated 21st December 1909."

We took a few shots of the head-stone.

Shooting the killing of Jackson was arranged in the same theater and on the same spot where he was shot. On the entrance steps, one shadow approaching, supposedly of Jackson, was filmed. Then a painting of a killer holding a pistol was juxtaposed. While filming the shadow, the camera was given a slight jerk for the effect of Jackson falling on the ground (years before I had read this technique in the *American* Cinematographer) and the next shot was a fast zoom to the headstone of Jackson. Editor Vernekar cemented these shots in a cutting so well that the overall impact on the screen was excellent.

Our next location was Poona city, 120 miles from Nasik. Here we had three important sequences: Savarkar's college education, his burning of foreign clothes and his meeting with Lokmanya Tilak, a renowned freedom fighter of early days. Tilak died in 1920 and Mahatma Gandhi took over the freedom struggle.

Shooting was done in the college hostel room where Savarkar used to stay in his student days. Gangadhar had a lighting problem as the room was too small and we had restricted camera movements. Mostly wide angle lenses were used. At the place of burning foreign clothes in 1905, a national monument has been erected. I used the same monument to depict the event. While taking a shot of the monument I kept a burning stove at little distance below the lens so that the monument could be seen through the heat waves along with some flames. The next shot was of a painting depicting the scene of that time. These shots put together conveyed the event very well.

In the Indian orthodox family we keep our shoes at the door-step before entering the house. I kept Tilak's sandals (65 years old) outside his study room and our 'Savarkar' was asked to keep his by the side of Tilak's before entering Tilak's study room. The next shot was a photograph of Tilak working in his study and looking directly towards the camera. Juxtaposition of these two shots gave an impression that Tilak is looking at Savarkar at the entrance.

To this day the progressive outlook brought by Savarkar 50 years ago continues to play its part in Ratnagiri. Kasbe, our Savarkar, was so involved that by this time he had completed reading a number of books on Savarkar and wrote a poem on him which was published in the Ratnagiri weekly magazine! Kasbe worked hard to play the Savarkar role as a prisoner in fetters, a writer in the jail, a welfare worker among the downtrodden, fighting against untouchability in society, organizing inter-caste community dinners, opening a temple for all caste people, improving on spoken and written language, etc.

It was in Ratnagiri, on March 1st, 1927, Mahatma Gandhi came to meet Savarkar. There is not a single photograph available of this occasion. I had to scratch my head to depict this. Again I used the most simple technique. I filmed a photograph of Gandhi walking, cut to the house where Savarkar lived in Ratnagiri, cut to Gandhi's sandals at the entrance door, cut to a pair of hands shaking in close-up, cut to two cups of tea on the table against two chairs and finally two photographs hanging on the wall, of Gandhi and Savarkar.

We returned to Bombay to make further arrangements to go to the Andamans Islands for the Cellular Jail shooting at Port Blair where Savarkar was kept to serve two life imprisonment terms. This portion in the film turned out to be the highlight in the documentary. By this time Gangadhar was promoted as chief cameraman with heavy responsibilities at Bombay headquarters, so cameraman Shridhar Joshi came with me to the Andamans. His contribution was equally good.

It was in Andamans that Savarkar was behind the bars under iron fetters on his legs, hand-

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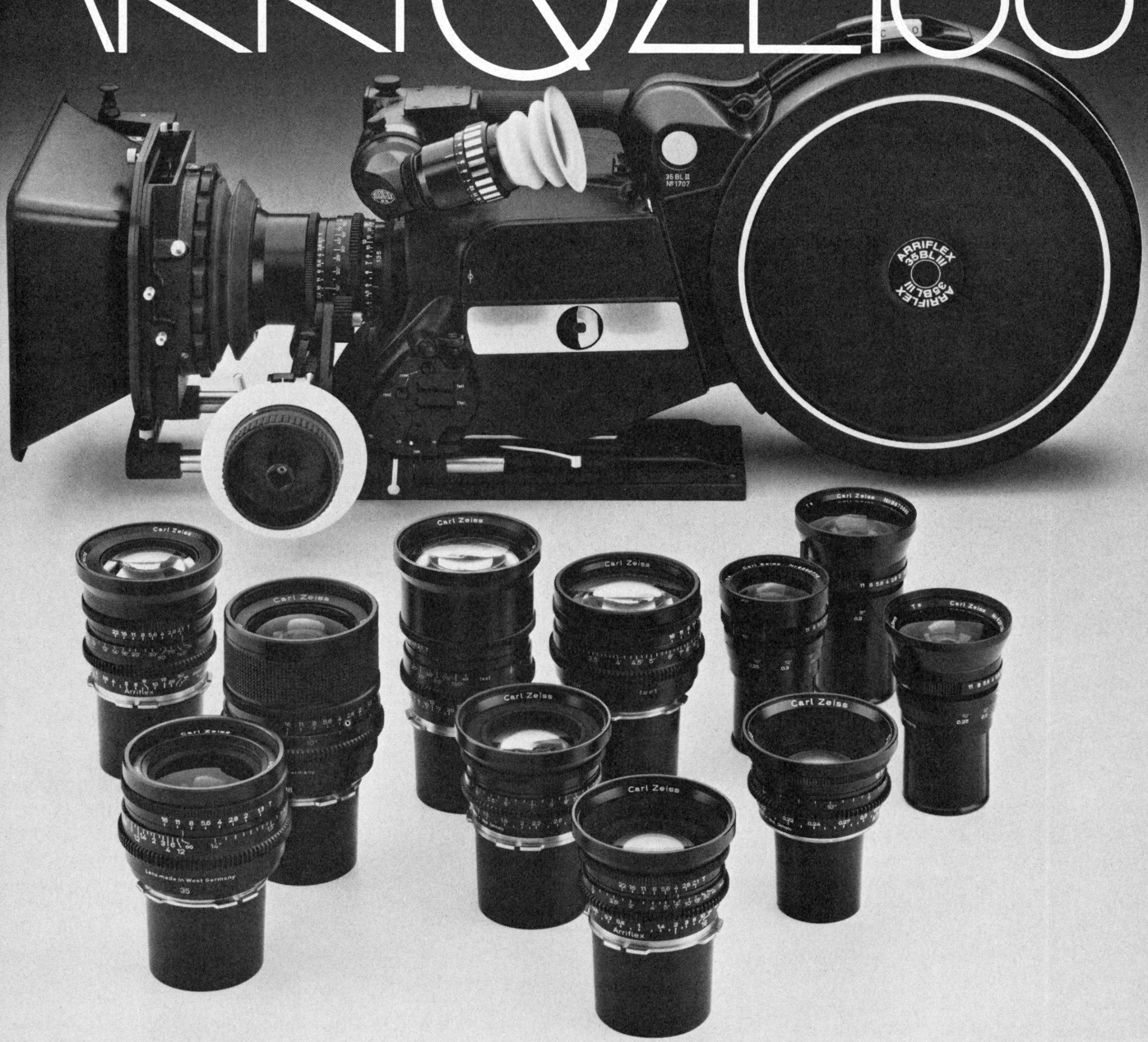

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prisoner is flogged s Savarkar watches om his cell.

cuffed and with the jail ticket hanging on his neck. It was during this time, in this condition, that Savarkar wrote 10,000 verses on the jail walls with pebbles. He was not allowed any writing material. Due to periodical white-washing, Savarkar had to memorize these poems and write new ones. This whole sequence was re-enacted and shot in low key lighting inside the cell.

Cameraman Joshi had an excellent suggestion on the entry of prisoner Savarkar to the Cellular Jail. This jail was constructed in 1897 to keep freedom fighters away from the mainland. It had seven arms spreading like an octopus ready to catch prey. The day Savarkar was brought here, not a single prisoner was allowed to see him. On the third floor in one of the wings of the jail, Savarkar was kept in the last cell. Joshi suggested that we keep our camera on the top of one wing of the jail and take a long shot of the fettered Savarkar being taken under tight security.

Then there was the chopping of dry coconut shells to take out fibers for making ropes. Then yoking on the oil-mill was again a tough job for our Savarkar. He had to push the oil-mill rod like a bullock to crush dry coconut to peel out oil. He had to go round and round. Here again we had used low camera angles and allowed reflected light coming from outside. When this sequence ran on the screen on release day, some of the ladies were heard sobbing.

At the time when prisoners are taken to the gallows, I arranged the camera in such a position that as soon as the prisoner was out of the frame, we zoomed forward and showed Savarkar watching from the third floor cell behind the bars. The pan and tilt were locked. The moment the zoom lens got the close-up of Savarkar, we gave a sound effect of the last words of the hanged prisoner, Bande Mataram (Long Live the Motherland). These were the words prohibited in British India and many were imprisoned for uttering them. For some, these were the last words on going to the gallows.

"Epic leap for liberty" from the British ship by Savarkar was also filmed at Port Blair. I managed to get the photographs of the Marseilles port in France during 1909. Accordingly, I selected a spot at Port Blair port and arranged for a ship near the port. The timing was almost the same, at the break of dawn. Two cameras were placed at two different angles. One was handled by cameraman Joshi and I was operating the other. At a given signal Savarkar comes out of the porthole and jumps. We repeated the shot three times to our full satisfaction.

Through the animation camera, the photograph of Marseilles port was zoomed from long to close to an anchored ship and mixed with the live shot at Port Blair. The jump shot goes silent on the screen, no commentary no music, except the sound effect of the splash in the ocean of Savarkar's jump.

By the time we came back to Bombay, our animation artist Devidasan, had done the art work on most of the photographs I had brought from London. They were exposed on animation camera. The result turned out to be as if we had done live shooting there.

We began editing the film in April, 1983. Editor Vernekar was well versed with the life and literature of Savarkar. We had to speed our work for the release target date—May 28th 1983—the birth centenary year of Veer Savarkar. After the film was brought to some shape, I requested music director Sudhir Phadke for recording songs. Incidentally, all the songs used in this film were written by Savarkar during his imprisonment. Phadke was ready with a group with well rehearsed tunes and so we completed the recording with the help of recordist Jagannathan in one shift.

Zul Vellani, a famous commentary writer and speaker narrated the film. We locked ourselves inside the cutting room for three days with a 'Do Not Disturb' sign outside. We discussed each scene as it ran on the Steenbeck and then his pen would start moving on paper. All the research material was kept ready for reference. I laid down only one condition—that his commentary should not disturb our effect tracks or songs. He agreed and we recorded the commentary.

On May 10th, 1983, members of the Film Censor Board and the Film Advisory Board cleared the film, without any cut, for all India release.

In 1984 the film bagged the prestigious Indian Filmfare award for the best documentary of the year. K.L. Khandpur, chairman of the panel of judges of the documentary award said, "The film had a soul." ■

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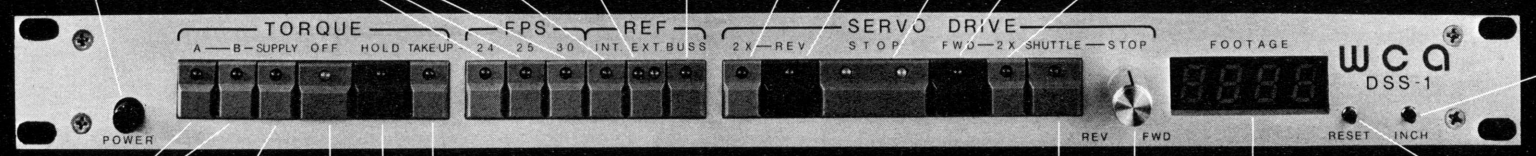

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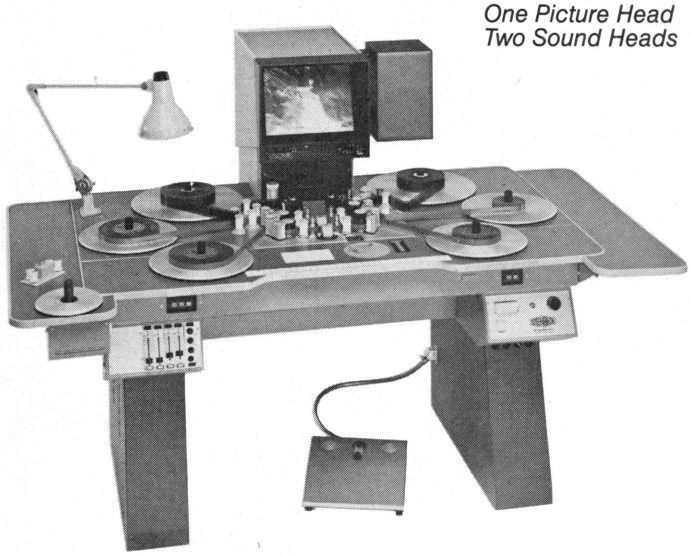

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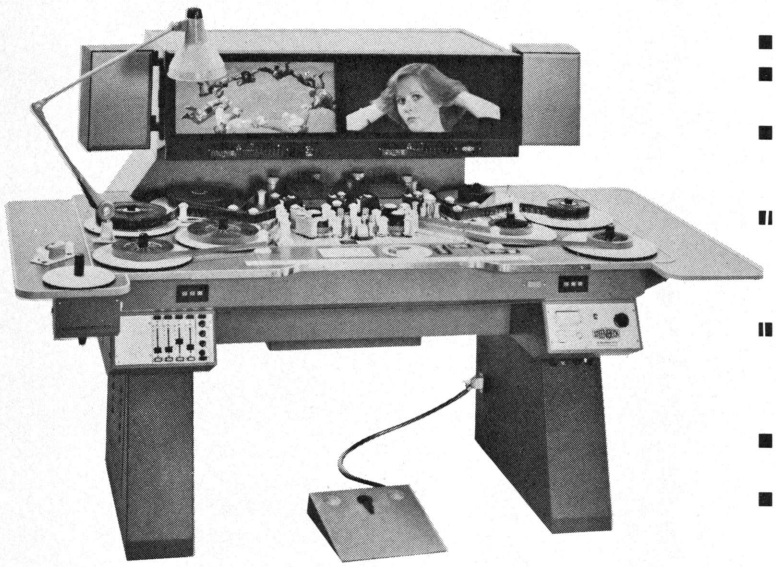

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Victoria Wozniak and David Burton Morris

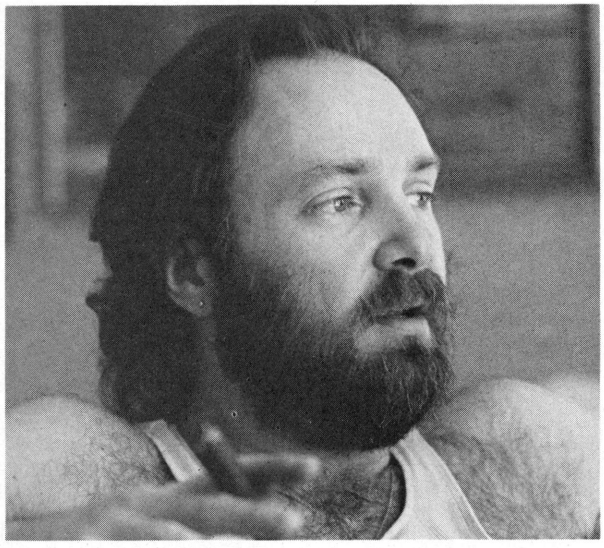
Thomas McKelvey Cleaver

The Sixties saw the end of an era, and there are few filmmakers who come from that time who have not been unaffected by their experience of those times. George Lucas chronicled the end of the Silent Generation in *American Graffiti;* Lawrence Kasdan also found success in dealing with what the survivors of the Sixties do with themselves today. In between there have been other attempts to deal with the phenomenon of the Sixties: John Sayles' *Return of the Secaucus Seven* being most memorable. Documentaries like *Monterey Pop, Woodstock,* and *Gimme Shelter* bring back the immediacy of the early times, their heights, and what can be seen as their demise.

Very few theatrical features have attempted to deal with the heart of that period, the times when people didn't really know or understand what was happening, when they were reacting more than acting. One film which resolutely works to remind the viewer of what it was like to be young in 1968, to be "18 and scared," is *Purple Haze.* Written, produced and directed by Victoria Wozniak and David Burton Morris, the film has had an interesting reception since its first release in 1983.

Victoria Wozniak

David Burton Morris



Carrie Frances-King

"What we wanted to say," relates Wozniak, "was how terrible it was that those were the choices then, live with uncertainty and go to a school you maybe didn't want to be in, go to Canada maybe forever, or go fight a war you didn't believe in. It was awful! No one should ever get so sloppy and lazy that they wake up and we have that kind of situation again." David Burton Morris is very upfront in his assessment of the film. "Even though I did do it, I will say it is the best film that's been done about what it was like being here at home then, 18 and anxious. No one's ever done this side of those times very well."

***Cinematographer Richard Gibb lines up a shot on location for* Purple Haze.**

American Graffiti was brought in for $750,000, due mostly to the cast and crew's commitment to Lucas' project. *The Big Chill* was a more normal studio film, costing around $10 million. *Purple Haze* was brought in for production costs of $225,000, with music rights costing more than the film, $250,000. "We would have been out a year earlier," Morris relates, "except for all the work we had to do with getting the rights to the music." Buying these rights was the responsibility of Victoria Wozniak. "The people I dealt with for the music were really very nice," she recalls. "They were very supportive of our efforts to make the movie for what we did. The attorney who handles the Jimi Hendrix estate usually charges $25,000 per song. He was so astonished we'd made the movie, he said "I can't charge you a lot of money, Victoria – you don't have any. How about $5,000 for all of them?' " She laughs, remembering, "Everyone came to understand that no one was getting a better deal. It got to be a club – everyone else is helping her, let's help her. All the artists really wanted to see the movie get up there because it was about them, too. We were sitting in our suite in New York the night before the film opened writing checks so they'd be all right by postmark to cover the rights."

Making a low-budget film means some very careful work at the outset, if the film is to look other than cheap. As Morris explains, "We shot in Minneapolis because we grew up there. A lot of the locations were old haunts we used to move in and out of in the Sixties." Wozniak remembers how she wrote the screenplay. "I could write for specific locations because I knew where they were. I could use particular memories of both David, myself and our friends to lend a realism to the small events."

Still, making a low-budget film requires a lot of help and belief by others. Wozniak explains, "Because we were 'native sons,' we hoped to get cooperation from the cities and we did. The mayors of Minneapolis and St. Paul were very helpful. They closed off a highway and major city streets, and charged us nothing! A lot of the locations we got for little or nothing. Shooting like that is to your advantage because either you know, or you know somebody who knows somebody, who has this thing you need and they'll give it to you or at least let you use it. Also, because we were local, people knew us and trusted us."

Raising money for a film without obvious commercial potential is difficult in the best of circumstances. "We didn't even try to approach anyone in L.A. for money," says Morris. "We raised it all in Minneapolis. The people we did know in L.A. all said, 'Who cares about the Sixties?' Victoria did almost all the financing, and she came up with a pretty good scheme."

"I came up with a way of financing it so nobody has to give you any money," Wozniak explains. "A way of pushing it around on paper, the way the studios have been doing it forever. I scaled the investment units way down, so a person could give us a letter of credit which we could take to the bank and get a loan on. No one had to liquidate anything, but they still had an investment. This way it was just signing, and people who were wavering on the edge were able to help." Morris continues, "Someone would give us a note and we'd ask if they had friends who they thought might be interested, and they'd give us leads. We had a policy that even if we didn't walk out with an investment, we walked out with at least one more name to go and see. The distribution deals we got for England and Canada paid for the music. All Columbia got was the U.S."

The distribution of *Purple Haze* is an object lesson in the problems faced by small films. "*Purple Haze* was the first film Triumph Films had ever put up money to obtain. The problem was that they released it like an art film, rather than a youth film, which it really is. They put it into New York and it got killed by the critics, then they sort of lost their enthusiasm for it." Wozniak continues, "They opened it in Los Angeles on a Friday, and pulled it off the screens the next Tuesday. On Wednesday we had a very good review in the *L.A. Times* and that Thursday we were the pick of the week in the *L.A. Weekly,* but the film was already gone! It was unbelievable! Columbia was also going through turmoil with Frank Price going to Universal, and everyone was ducking for cover. The studio

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system is set up very well to do what they do, but if you don't fit, you're out the chute."

"To their credit," Morris relates, "they did go back and give us money and listen to our ideas of how to release it. They let me hire Jeff Dowd, who did the release of *Diner* and *Heart Like a Wheel* the second time around, and let me use my own graphics for advertising. They didn't have to do that, contractually, so we should give them credit. Now their interest is rekindled."

As Wozniak sees it, persistence pays off. "We won the U.S. Film Festival in Salt Lake City, and the picture opened in four theaters there the same week that *Gremlins* and *Ghostbusters* opened. One theater held it over a week, so that was pretty good. It made the people at Triumph think again about this little film they considered a turkey."

Like many independent filmmakers, Wozniak and Morris look to what happened in Europe in the early Sixties, and to their life experiences for inspiration. "We were at the University of Minnesota during the Kent State strikes in 1970," Wozniak recalls, "I was an art student and got involved with David when he picked me up hitch-hiking. He was shooting these little 8mm documentaries we were using to explain issues to people." Morris continues, "We were making movies in three days, the ratio was 2 to 1, 3 to 1. They were rah-rah pieces to show the students, to show at church groups, unions, to get support for what we were doing."

Morris was 13 when he first became interested in filmmaking. "It got put by the wayside when I went into photography," he remembers, "then I came back to it. I went and saw a Cuban film – *Memories of Underdevelopment.* In the early Seventies everyone was trying to make an exploitation horror movie as a calling card. Somehow that didn't appeal to me. I saw this film and it knocked me out. I came running home and told Vicky, 'there's no reason we have to make a horror film, no reason why we can't make a film like this. I don't like the genre anyway!' There was no movement then like now of people making narrative features. We were among the first to do it. That was where *Loose Ends* came from."

The "movement of people making narrative features," referred to is now loosely called the American Independent movement; the films are surprisingly good, so much so that there are film festivals in Europe devoted to the American independent feature, and such prestige events as FILMEX now have special segments devoted to the American independent.

Wozniak and Morris were instrumental in helping to form the institutional focus of that movement, the Independent Feature Project. As Morris remembers the beginning, "The Independent Feature Project started in 1979 when a call went out to a lot of independent filmmakers to converge on New York for a three-day conference about the state of independent filmmaking. The IFP was born out of that. A year later, Gregory Nava and Anna Thomas, who did *El Norte,* gave me a call and suggested we start an L.A. branch of the IFP. The IFP/West started from a meeting of the three of us in their living room. Now, the L.A. office is larger and the membership more active than New York."

According to Wozniak, "We started giving the people who were members more than just involvement with FILMEX. For the last year, the entire board has worked on doing little mini-seminars, workshops, evenings with, things like that. It's mostly been with directors, but also with lawyers about how to set up limited partnerships, things like that.

"It's hard to tell how many people are active," she states. "We're putting out a directory so you can see what people have done if you're looking for a crew. What the IFP wants to be is a conduit between all the independent filmmakers out there and the entire film industry who have a service for them, not just the studios. There are a lot of people who would like to attract the independents' business; they're willing to give deferments, cut prices in almost all facets. We'd also like to be a fail-safe for the people who rip you off.

"We also want to re-educate the public. In Middle America, when they hear the word independent, they think 'Oh. Real exploitation, low comedy, lots of blood,' things like that, or they think of high art that they won't understand. They don't understand that they can see quality, independent features that maybe don't have a lot of stars, but they're good films. We also do things like put a mailing to people when an independent film is opening, telling them to go so the movie will survive its first weekend."

Both Morris and Wozniak wax enthusiastic in discussing the recent developments with the Independent Feature Project/West. According to Morris, "The corporate support we got for the annual convention this year shows how strong we're becoming. The AFMA is trying to bring us in now, putting on special screenings for our works. American Airlines flew people here from New York for free. All this shows that the American independent film is very viable. The studios only make 170 films a year. Who does all the others? This is where the independent filmmaker comes in. With the explosion of cable that has happened, and the coming explosion that is going to make this look like nothing, they are going to become more important than ever."

"The truth is," says Wozniak, "whether you are being financed by a studio or a group of businessmen, what is really happening is they are investing in *you.* Your passion; your credibility. That's the bottom line. To that extent, we are all independent filmmakers, and that's the truth." ■

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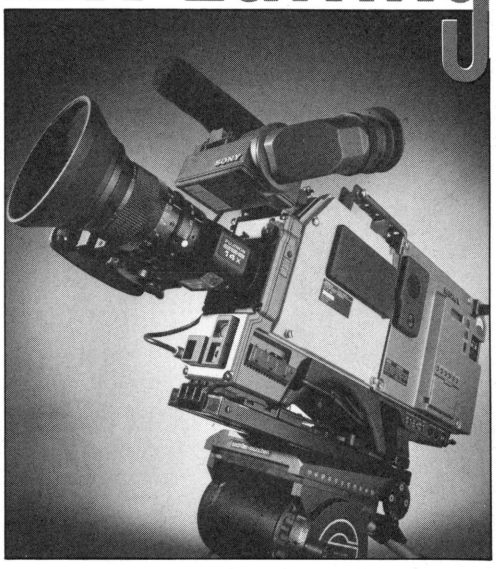

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Video monitors in the set for the Leonov required 15 playback machines all interlocked at 24fps.

Video effects for 2010

Nora Lee

The film *2001: A Space Odyssey* is the acknowledged turning point in modern special effects. A new company called Video Image hopes that the sequel, *2010*, will also be a milestone – this time, setting the standard for a new branch of special effects – video effects.

Video images have invaded daily life and in consequence of the trend, they have now invaded film. In *2010* several important story points are made on video monitors. The monitors are more than fancy wallpaper. For a director like Peter Hyams who believes that every frame of film is as important as every other frame, it made sense to take his video playback needs to a group of professionals.

For a professional like Greg McMurry, it made even more sense. The story actually be-

3D computer animation was accomplished on an IBM PC.

gan in August, 1983 when McMurry found out that Hyams was going to direct *2010* and that there were a lot of video monitors included in the set designs for the interiors of the two spaceships – the Russian *Leonov* and the American *Discovery*. McMurry thought that such a large amount of playback material would be best handled by a company that could do everything – from pre-production consulting and storyboards through execution and playback of the video on the set. For this purpose he gathered together three other people whose combined talents proved to be the perfect combination to do the job.

Rhonda Gunner, who does video editing and playbacks on the set, got her experience by working for various network news shows. When she left KNBC three years ago she was supervising the technical staff that produced three nightly news casts. Her first film was Douglas Trumbull's *Brainstorm*.

McMurry also prevailed upon his friend Richard Hollander to provide the computer software experience that would be necessary to set up the animation and graphics systems. Hollander is an electrical engineer and computer science wizard from Berkeley who turned his expertise into an eight year affair with motion picture special effects. He has contributed to such films as *Star Trek: The Motion Picture, Bladerunner,* and *Brainstorm* and he won a Clio for a Panasonic commercial that he computer-animated for Robert Abel and Associates.

Part of Hollander's job was to pull together the basic equipment necessary to generate the art work for the film. He chose two IBM PCs and Cubicomp frame buffer as the basic set-up and then added three software packages. Two were also "off the shelf" – one for 3D graphics and one for painting. He wrote a third program to do animation. With this as the basis, the company was ready to generate art.

The fourth member of the company is an artist who also has gotten most of his experience in special effects. John Wash is an animator whose work has appeared in *Star Wars, The Thing, Blade Runner, Brainstorm* and others. His creative abilities, added to the fact that he developed and wrote a program for his home computer so he could do graphics on it, made him a natural for this endeavor.

McMurry, too, has many years experience in special effects. He has worked in TV news and was on hand to help engineer some of the first motion control systems for Douglas Trumbull. His credits include *Star Trek: The Motion Picture, Close Encounters of the Third Kind, Blade Runner,* and *Brainstorm.*

The collective backgrounds of Greg McMurry and his partners are the key to understanding their approach to what they do. Video Image does computer graphics for playback on a set, but they do it from the perspective of a special effects team. Once together they produced over an hour of video material for *2010*. They worked with Hyams from the phase of "what do you want to see on which screen, how

A display for the medical bay which was created by digitizing a Styrofoam head.

long and where" to the actual playbacks on stage.

The company was able to do the things they did in the amount of time they did—eight months total – because they knew from experience not to be purists. It just would not pay.

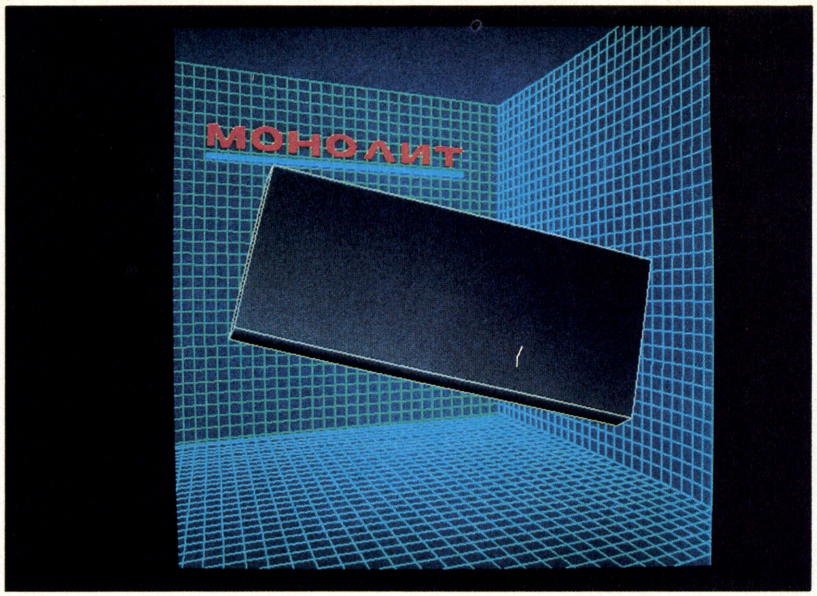
"We would drive a traditional graphics house crazy," said Richard Hollander and McMurry echoed the sentiment. "Our approach from the beginning was to provide video graphics utilizing computer animation or traditional means – whichever provided the best and fastest results.

"We create the imagery any way we can," continued Hollander. "If we can't do it on the computer we will generate it, using traditional methods. We got our training in special effects and most of it with Trumbull. We don't have to rely on computer graphics. On *2010*, though, I felt we could really capitalize on a medium resolution graphics system and the computer.

"We knew that everything on the video screen was going to be filmed so we knew we didn't need high res graphics. If you are going to use your computer and generate an image that is going to go full screen, then you have to talk about using some other more powerful equipment. We were going after a specific market. Our stuff was never intended to look like anything other than information on a video monitor.

"We were always ready to use traditional animation if we could not get the work done. But as it turned out we truly capitalized on the computer's speed. It really did do images fast. If we had tried to do the same amount of images on an Oxberry, we could not have produced nearly the same amount of material," Hollander said.

Once Hyams conveyed his video needs, Video Image became a second special effects unit. They dealt with their portion of the film in much the same way as Richard Edlund was dealing with the main special effects.



Computer graphics techniques proved more efficient than traditional backlit animation techniques for the computer displays on 2010.

"John Wash and Rhonda Gunner read the script and broke it down into scenes that looked like they required something specific on the video monitor," said Hollander. "Then we made a little shot sheet that indicated the scene. John and I would go through each one of the shot sheets and try to figure out what we could possibly produce to go in that scene. Those were shot sheets that were *scene*-specific. There were other shots that had video in them, but the information on the video screen was not scene specific. We called them the generics. These shots had to have something interesting and it had to last a long time. We handled it pretty much the way you would handle any effects sequence. We broke it down to figure out the material we would need and went from there."

According to Wash, deciding just what would be on the screen and what it would look like was a large undertaking. "Our first research into the look of the graphic displays was to find out the present state-of-the-art in space and the military. We found that modern cockpits were being designed with a few video screens which replace the multiplicity of gauges and dials that a pilot once

A typesetting program and a data base of Russian phrases made it possible to instantaneously alter the supers on the graphics displays.

The design for the Leonov reflected the current trend towards graphic displays of information rather than gauges and dials.

had to constantly monitor. I think this same design philosophy is reflected in Syd Mead's designs of the *Leonov* interiors. Many screens are visible, but few dials or gauges are present.

"We did additional research into the look of the data that was put up on the screens. Here we relied heavily on scientific and medical journals for clues as to how graphics information is presented to scientists, pilots, and doctors. As always, Peter Hyams encouraged us to think of our work not as some esoteric exercise, but as a practical extension of today's high technology to the year 2010," Wash said.

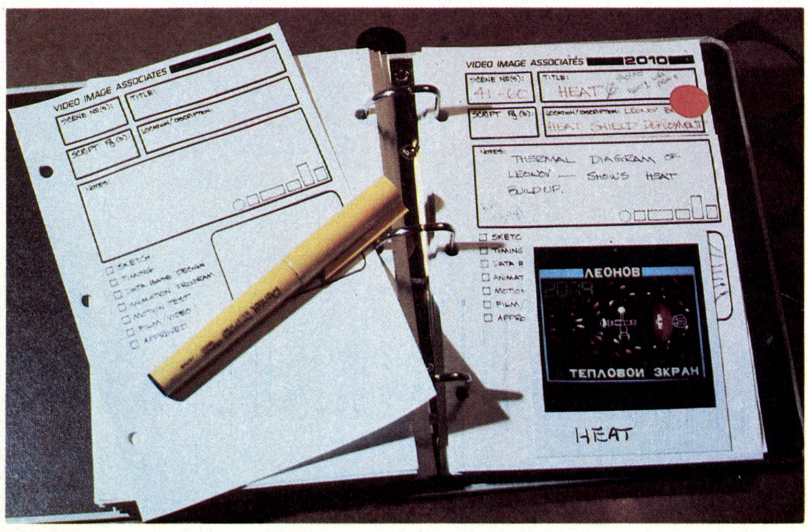
Logically, in any spacecraft there are informational monitors that give out nothing but written information. But just to add a challenge, the text displays on the *Leonov* were all in Russian. This was something they expected and planned for, but the planning was a bit unusual. Hollander recalled, "We had two things. We had English expressions translated to Russian on paper and we had a typesetting program. I remember one night John was sticking characters on our key board. We put the backward n on the n spot and the backwards r went to the r spot. In other words we matched everything up visually, not alphabetically true. Then we hired Bill Dungen, a software expert who knew Russian and he looked at it and said, 'Hey, you guys have this all wrong!' We had to tell him that each letter was where it ought to be to keep us from searching for it.

"We would look at the translation page and then hunt and peck till we had the line in the computer. Then using a typesetting program we could alter the type face to make any size letter we wanted. We just created a data base of the phrases that we could use and manipulate it depending on the need.

"If we had done it strictly with art work, we would have had to have everything set in type of various sizes. Every scene would have had to be planned a week or two in advance of when we would shoot. Once the information was in the computer, though, we could do a whole range of things almost instantly," concluded Hollander.

The computer was very familiar to Hollander and to McMurry, but initially, Wash was a bit resistant. He was an animator and felt that maybe the best way to do these shots was with traditional back-lit animation. Wash explains, "In the beginning of our work on the film, we relied heavily on sketches I had drawn up to communicate our ideas to the director. I have worked on the production of graphic displays for several features in the past, and in most I made use of back-lit animation and other traditional techniques to mimic computer imagery. This was because I felt that using computers to generate graphics would prove too expensive and time consuming. During our work on *2010*, however, my past prejudice gradually disappeared. I found I could easily and quickly manipulate images once I developed a good 'speaking relationship' with the computer. One result of this ease of operation was that we almost unconsciously moved from designing our scenes with pencil and paper to doing our design work on the computer itself."

Because they were not working with a million dollar Cray computer, they were limited in some ways, but often a limitation was nothing more than an incentive. One medical bay display re-



A background in photographic effects is reflecting in the storyboard shot sheets used to plan the video sequences.

quired a 3D model of a human head. Hollander explains how they got the head into the computer. "For this scene the head had to rotate and do some other stuff and we didn't have a head in the computer database at all. So we had to figure out how to get it in there.

"We took a Styrofoam head that Mark Stetson had made and 3D graphics consultant Peggy Weil drew triangles all over the head. She just picked spots, drew triangles and then labeled them with a number. Then she labeled each vertex – each intersection of the triangles – with a number. I put the head on a milling machine and she and Steve Eagle, our production assistant, spent an entire Saturday getting down the information so it could go in the computer.

"I made a pointer that fit in the chuck of the mill. We made a reference point and called it 0,0,0 to represent the x,y,z axis origin. She would take the point and just make it touch the vertex and call out the information she read on the three dials on the mill.

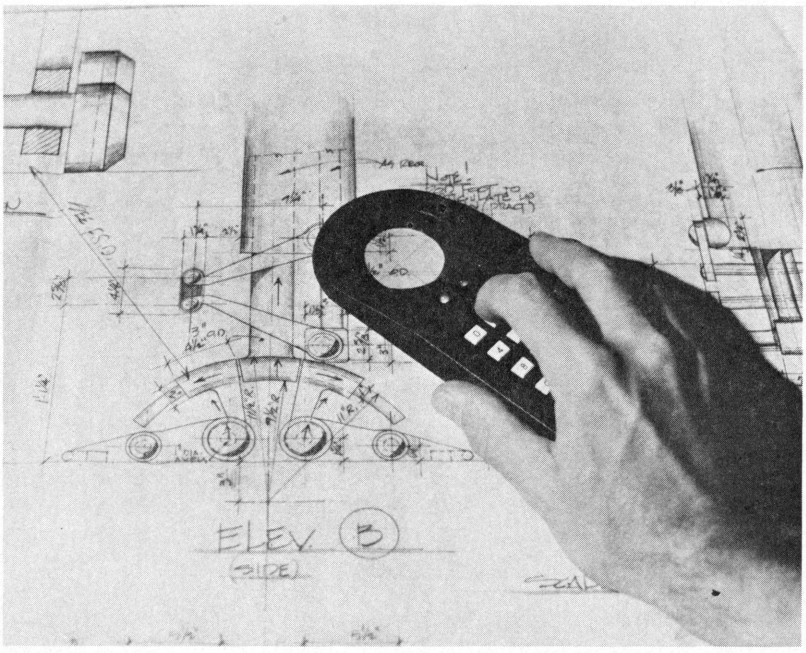
"What we ended up with was a very long list of all the vertices of all the positions on the mill. So I wrote a program on the computer for that information. Then Peggy sat down and entered all the information on the list, as well as which vertices made up which polygons. With the help of a second program I wrote, the computer took the information and turned it into a three-dimensional head. Actually, there were some mistakes at first. Part of the mouth was sticking way out in front.

"This method is the poor man's way of doing 3D modeling. There are $25,000 pieces of equipment that we could have used to do the same thing, but. . . ."

Greg McMurry described another, more ambitious, shot that might make a purist uneasy. "One of the problems with a movie like this which has a lot of post production," McMurry said,

Richard Hollander at the keyboard.

A terminal keyboard with Russian characters positioned to facilitate hunting and pecking in creating the supers for the displays.



Digitizing a blueprint for a spacecraft so that the computer can create a 3D model.

Mark Stetson's sculpture which was digitized by taking measurements on a milling machine.

"is that much of the stuff you would normally see on the monitors in the ship hasn't been shot yet. It will not be shot for months. But there are some of those scenes that you would really like to see included in the live action. We came up with a list of things that you might see on a monitor.

"It was a minimal list, but it included a camera aft view – looking down the *Leonov* – showing the crews' quarters spinning. We knew that was a shot we could use all the time and we wouldn't have to worry about planets in it. So we got a model shot of the *Leonov* from BFC (Boss Film Company) that looked very similar. We had just enough shots like that to make it seem like the people on board really could see outside the ship.

"Some things we could anticipate, but there were other shots we could not fake. Unless you burn something in, you can shoot the whole movie and you never see anything on the TV monitors that is a product of post production. They don't even build a lot of these things until after live action has started. They never do post production first. But there were times on this movie where it had to happen that way – sort of backward."

McMurry continued, "There's a scene that is really important to the film where a probe is launched from the *Leonov,* flies to the surface of Europa, goes on a search mission over the surface of Europa and sees chlorophyl on the surface. Then, for some reason, the probe blows up. The only way the crew can see all this happening is on a monitor. So, they had to do that shot before they got into post production. In fact, it is one of the first shots they had to do. They also knew it had to be done with miniatures and motion control.

"Initially, everyone was unhappy with the idea that this scene would have to be shot on film. The idea was that there was a video camera on the probe, not a slick movie camera. Peter didn't want it to look like we did a bunch of film effects and played it back on the monitor. A way had to be found to do the shot on video with motion control. So Video Image checked it out and we suggested that BFC set up their stage for motion control and do the shot with video and a stop motion recorder – Sony BVU 2500 – which can record one frame at a time. Then they could electronically convert it to 24 fps and sync it with the motion picture camera.

"So, BFC did this whole sequence that shows everything – leaving the *Leonov,* flying by a planet, and down to the planet surface – on video. They built a huge planet surface and scraped the camera over the surface as though the probe was flying right on it and, BAM! it blows up.

"Well, what Peter wanted was to have this shot running on one monitor in the live action set and then, on another monitor close to it, he wanted what a computer would realize from this information. He wanted a kind of tactical and graphic representation of the real scene," explained McMurry.

A true computer graphics house probably would have insisted on doing an accurate three dimensional mapping of the planet surface as well as taking precise measurements to determine camera angles and they probably would have graphically modeled the camera and the arm to determine the exact view the camera had at all times. Time and money and computer capabilities would not permit Video Image that kind of luxurious precision.

"Our special effects background really came in handy on this scene," Hollander said. "The way we figured out how to get that planet surface into the computer would make a true graphics artist squirm. We asked Virgil Mirano, the still photographer at BFC, to

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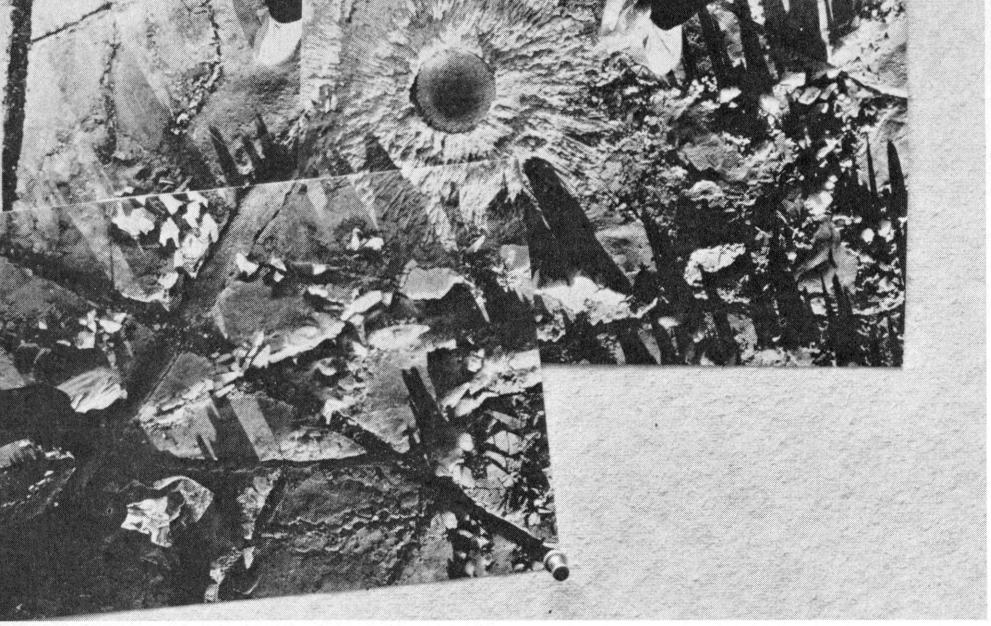


Photos of the miniature surface of Europa which were used to create a corresponding computer model of the moon. The photographer's feet were not digitized.

walk all over the surface of the planet and shoot straight down on it. Then we pieced together this mosaic and I digitized it into the computer. I guessed at the heights of the mountains. The most important part was that whenever the probe panned or tilted I had to pan or tilt and it had to match closely. We found that if we were just a frame or two off it showed up. Otherwise, I just estimated the velocity of the probe and matched it by eyeballing."

Once the artwork, no matter how simple or intricate, is finished, Video Image has two ways of recording it. "Sometimes it is advantageous for us to have film between computer animation and the finished video playback," McMurry explained. "We can do double exposures, lay something over it, burn something in. Film is a nice hard medium, too. You expose that film and it is there. It is a conventional way to do graphics, too. Graphics computers, especially those that are medium to high resolution, are not compatible with video . . . not to mention 24 frame video. So you need something you can put between that is compatible, so 35mm film is perfect.

"We set up camera systems that can shoot off high resolution monitors. It can take seconds or as long as a minute for a computer to realize a particular image in color, so it would be impossible to record it in realtime on tape. Even the powerful Cray computer has to have time to derive its pictures. If you want to move a 3D model even a little bit, the computer has to analyze every little point. It takes awhile. Once the computer finishes a picture, it triggers the camera so the image can be recorded on film.

"At other times we can go straight to video. It took us a very long time to convert our computers to operate at 24fps. They were operating at some obscure frame rate. In fact most graphics systems don't have to operate at a frame rate. That's not what they are designed to do. With our converted system we can do either animation or real time graphics straight on to video tape.

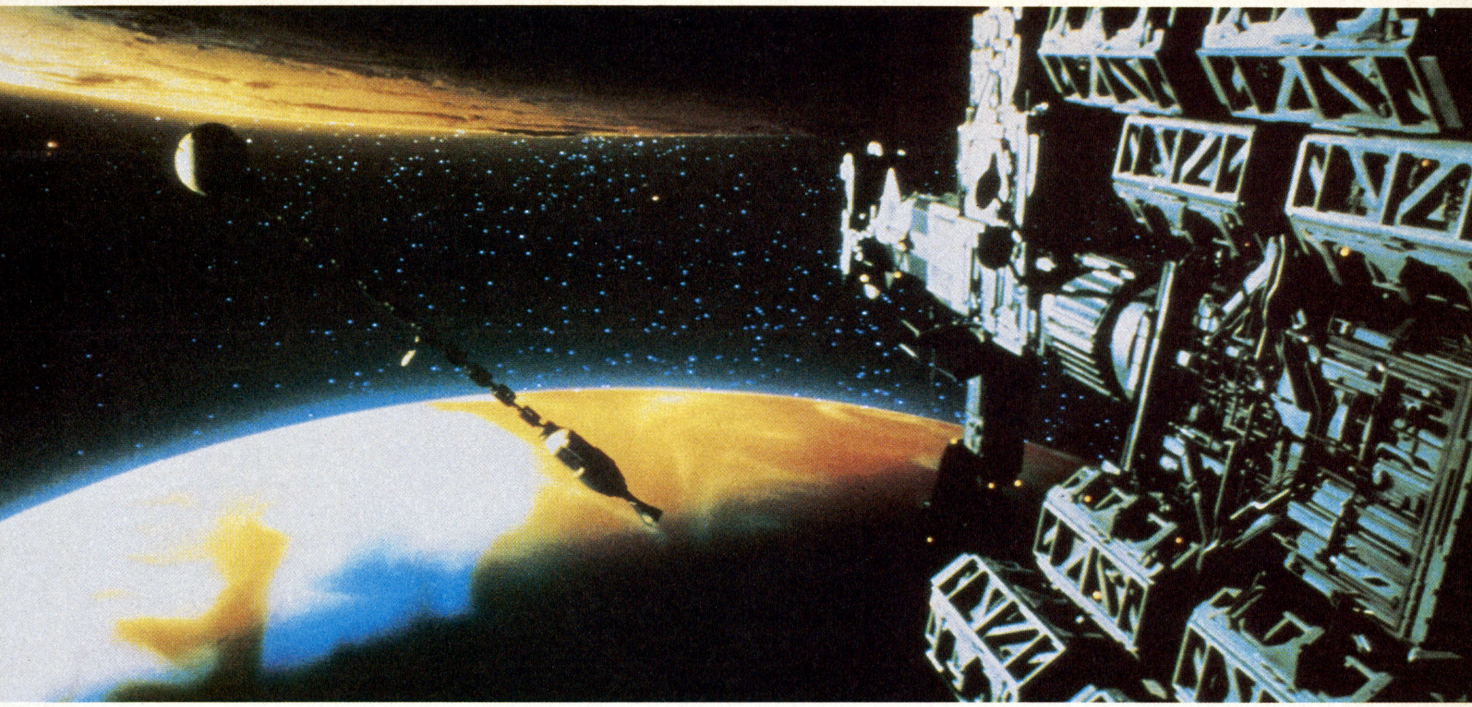
"Richard and I developed our own controller to do animation on the video tape directly, but we can't do the double exposures we like to do and the double passes. So we will probably always use film as an intermediate process on some shots," McMurry said.

Video Image can create art and graphic animation for video playbacks, but that is not all. They actually take care of the playbacks themselves. In order to be able to do this, McMurry had to convert all his playback machines to 24fps in anticipation of the demands that *2010* would place on the company. There were 15 tape machines on the set and they were all interlocked. They were controlled by a master playback unit and all the equipment was handled by a single person – Rhonda Gunner. Each tape machine's signal could be split to go out to a number of monitors.

The 15 machines were divided into two categories. There were three master machines and 12 background machines. The 12 background machines could be cued up fairly accurately. The masters were operated by computer and were capable of being cued by time code to very specific locations. They could be rolled simultaneously, first one and then the other, or one could be supered over another. Gunner could cut from one to the other and make color corrections.

McMurry worked on the set with the director as liaison to Gunner. The last link in Video Image's service is the little black box that McMurry attaches to the camera so that his video monitors will sync with the film. He sees himself in much the same position on the set as a grip, a gaffer or the prop man. He is an extension of the director's movie making ability. "One of my greatest fears," says McMurry, "is that the crew will look at their call sheet and say 'damn, another day wasted shooting video.' I want them to be comfortable enough that they look at the schedule and say 'Oh, today we do the video stuff. No sweat. We can shoot as much today as we did yesterday.' "

McMurry concludes, "When we took this job, we knew there were going to be tough deadlines and we were prepared to work all night if we had to. What more can you do? We wanted this film to have more specific computer graphics than anybody had ever seen before. We wanted people who looked at this film to say 'Can you believe all the computer animation?' Obviously, we are not the most important part of this film, but for people who know about effects, we really wanted to create something for them to notice." ■



The Russian spacecraft Leonov observing the American Discovery between Jupiter and Io.

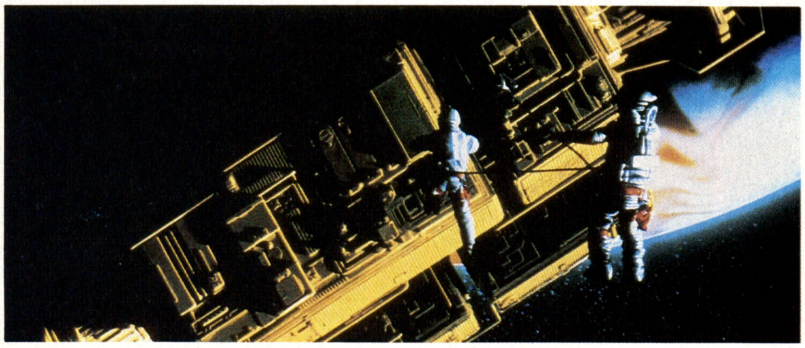
Visual Effects for 2010

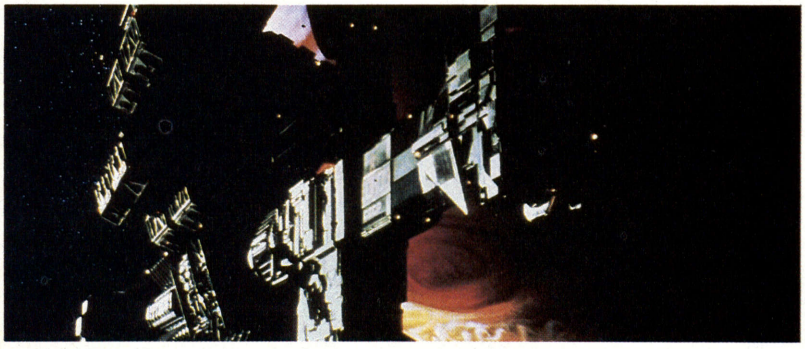
Bob Fisher

If Hollywood were Camelot, who would you cast in the role of Merlin? Richard Edlund, ASC, wouldn't be a bad choice. During the past eight years, Edlund has been nominated by his peers for five Academy Awards for special visual effects, and he has been awarded the Oscar four of those times.

Star Wars, The Empire Strikes Back, Raiders of the Lost Ark and *Return of the Jedi* are his Oscar-winning films. However, Edlund ranks *Poltergeist,* his other nomination, high on his list of personal favorites. He explains that since *Poltergeist* is more steeped in reality than the other films, the believability of the visual illusions was even more critical to the success of the movie.

For many people, these five films alone would be the stuff of which careers are made. However, there is already good evidence that Edlund has just begun. He has already scored one major visual effects triumph in 1984 with *Ghostbusters,* and now there is





Composite frames produced by Entertainment Effects Group under the supervision of Richard Edlund, ASC.

2010, the long-awaited sequel to Arthur C. Clarke's *2001: A Space Odyssey*.

Creating special visual effects for MGM's *2010* could be compared to singing Caruso's best arias at the Met or trying to sculpt a better statue of David than Michelangelo. For *2001, a Space Odessey*, Stanley Kubrick and MGM earned an Oscar for visual effects which were described only in superlatives.

Clarke's repeat best-seller is about a joint Russian/USA venture to Jupiter in search of the answers to questions about the fate of *Discovery*, its astronauts, and the monolith. Like the original, the sequel is certain to provoke intriguing discussions and tantalizing thoughts. Peter Hyams' movie adaptation is being presented in wide screen 35mm anamorphic format, with Dolby sound.

"It was an exhilarating experience," says Edlund. "Peter (Hyams) is a director who reaches into all of the corners; he wants to understand everything. He was in the unique position of producing, writing, directing and shooting *2010*."

Edlund describes *2010* as "a real finesse picture. We have visual effects shots on the screen for a very long time. That can be dangerous. Anytime you give an audience 10 to 20 seconds to look at a painting or a model, you are taking a chance that you will destroy the illusion. We are asking people to sit in a theater surrounded by images on a big screen and imagine they are out there on the perimeter of Jupiter. Every shot had to be perfect."

How does Edlund describe the *2010* look as it relates to visual effects? "Peter used a lot of backlight and smoke for the live action, and we worked very closely with him to maintain the look that he wanted in our visual effects," he answers.

Special effects art director George Jensen is credited by Edlund with composing the visual imagery described by Hyams in such accurate and precise detail that the storyboard even dictated the choice of lenses. There were also weekly production meetings where every shot was constructed, taken apart and then put back together again. There must have been times when the pressure was unrelenting. Feelings can easily rub raw in this type of a situation; however, Edlund observes, "we had a great matrix of people who have become a family."

That helps a lot when you are searching for perfection under great pressure. As Edlund adds, "On a long, intense project like this, it is important to have people who have a sense of humor. Don't

underestimate the importance of crew chemistry on a project like this."

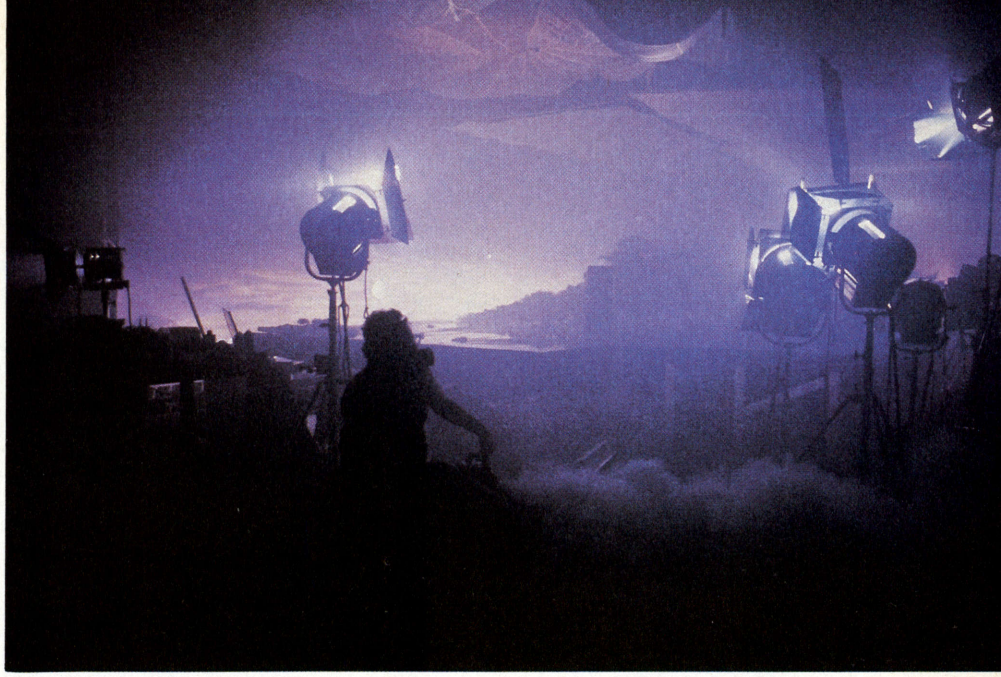
Comparisons between *2001* and *2010* are inevitable, however that doesn't appear to faze Edlund. "We had an entirely unique set of challenges," he says, not the least of which is the fact that today's audiences are much more visually sophisticated.

Starting with *Star Wars,* there have been tremendous advances made in visual effects technology. Edlund calls it a renaissance. However, the rapid pace of both technical and creative progress has exacted a price. "Each picture becomes more difficult," he says, "because we have raised the expectations and the level of visual sophistication of our audiences."

2010, as the title suggests, occurs in the near-future. And, it also covers some very familiar ground. "Just about everyone has seen at least some pictures of the planet Jupiter because of the highly successful Voyager 2 space probe which returned images of that planet to Earth," Edlund points out.

What makes *2010* work? "The audience has to become so absorbed in the story that it seems real," he answers. Every shot involving miniatures, mattes, optical composites, digitally enhanced computer graphics and other visual effects has to blend perfectly with the live-action aspects of the film. And there are some 300 such shots, composited under the tasteful eye of Mark Vargo, the optical department supervisor.

Edlund discusses one example. "There's no fill light in space except where you might have a believable practical source," he says, giving meaning to this observation by holding his arm in front of his face to demonstrate how some illumination bounces back. "Therefore, we decided that our space scenes, a key part of the picture, should be devoid of fill light." That had tremendous ramifications since it affected every shot involving Jupiter,

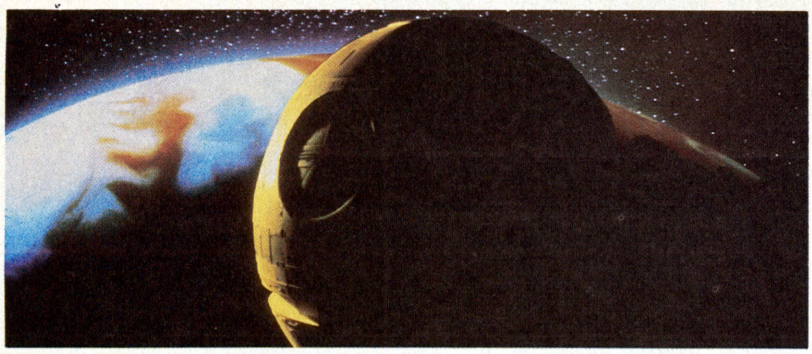


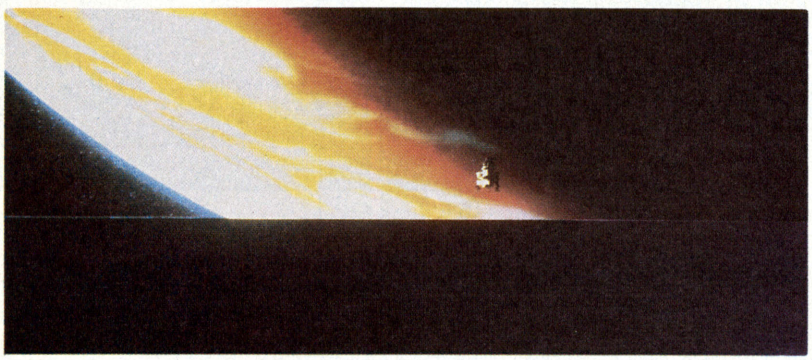
Prepping the tabletop landscape of Europa used for the final effect.

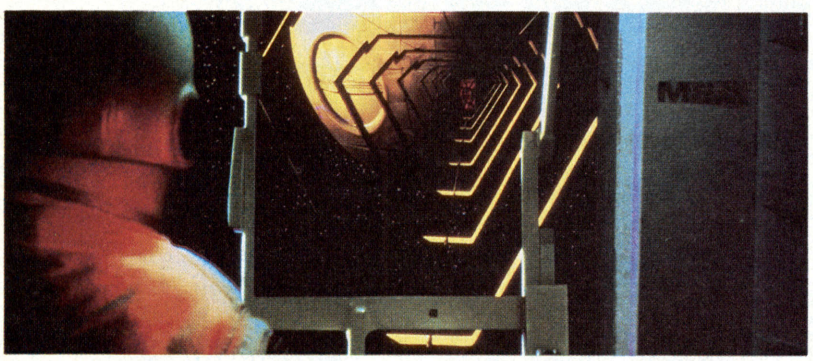
Photos by Virgil Mirano ©1984 MGM/EEG

Peter Hyams discussing a sequence with Edlund, Albert Brenner, Mark Stetson and Jonathan Zimbert.

The decision to shoot the space scenes with absolutely no fill light resulted in the use of black backgrounds with the models and the front/back lighting technique to create mattes instead of blue screen. Blue screen photography generally requires some fill light to wash out the blue reflections.







its satellite, Europa, and the miniature models of the *Leonov* and *Discovery* spaceships, as well as actors in the Discovery boarding sequence.

"Mark Stetson built very elegant models of *Discovery* and *Leonov*," says Edlund. The former, more or less, had to be divined by viewing a 70mm print of the original *Discovery* used by Kubrick in *2001*. The original models and plans had been stored in England along with *2001* sets in a commercial warehouse. "Mr. Kubrick told me that one year someone from the studio didn't want to pay for storage anymore, and everything was trashed," Edlund says.

Most of the miniatures were filmed against a black background by cameraman Dave Stewart, who for mattes used a combination of front and back lighting, and only occasionally blue screen, a technique which has more typically been used for this purpose. "Peter wanted a look of reality, and that meant that there would be no fill light on space vehicles or planets," Edlund says. Using the front/back lighting technique, Stewart shot his mattes by doing repeat shots silhouetting the miniatures against a white background.

Edlund explains that when you shoot with a blue screen background, some blue light is almost inevitably reflected in the shadow areas. In the *Star Wars* films Edlund used fill to wash the blue reflections out.

That was the right decision for that film. "I think that the audience didn't have any trouble accepting fill light in space in *Star Wars* because of the nature of the story," he says. "It is a fantasy."

The front/back lighting technique used by Stewart would not have worked for *Star Wars*, he adds, because so many of the scenes involving miniatures had blurs caused by models streaking in and out. "You need a harder edge to get your mattes," he says.

"The decision to shoot against a black background was pivotal," Edlund continues. "I believe that it will affect the way the audience perceives this film. Maybe no one out there will know that there is no fill light in space. But, in films like this, audiences have a way of sensing it when something isn't quite right, especially since most people have seen actual NASA space footage."

Edlund contends that it doesn't take a lot to destroy an illusion. "Movie-going is a social experience," he says. "I call it the coliseum effect. When you get a crowd reacting positively, it becomes contagious." However, the same holds true if just a few peo-

ple in an audience don't believe in an illusion. "A visual effect might only be on the screen for a few seconds; however, if it doesn't feel right to some people, others in the audience are going to pick up on that feeling."

This unusual arrangement paid more than financial dividends. "It would be difficult to find two pictures which are less alike, than *2010* and *Ghostbusters*," says Edlund. *Ghostbusters* is comic book reality; anything goes. EEG composited a great deal of animation with live-action, and there were those wonderful monsters, typified by the 120-foot tall marshmallow man. In contrast, *2010* is stark reality; everything must ring true. This includes crucial scenes supposedly taking place on the perimeter of Jupiter, incorporating live-action with miniatures against backgrounds of matte paintings and constructed planets. Then, there was the challenge of Jupiter. "The audience must believe that they are seeing Jupiter," says Edlund. "Everything depends on that."

Edlund describes *Ghostbusters* as a short, fat project and *2010* as a long, thin one. By this he means that it required a huge burst of creative energy to produce visual effects for *Ghostbusters*. EEG created some 200 shots for *Ghostbusters* over a short 10 month period, and had 160 people working on the film at the peak. Visual effects for *2010* were created over an extended 16 month period with peak crews at 100 or so. Perhaps 20 core people played key parts in creating visual effects for both films.

"I think that the fact that these two pictures were so different, helped us to keep our perspectives straight," Edlund observes.

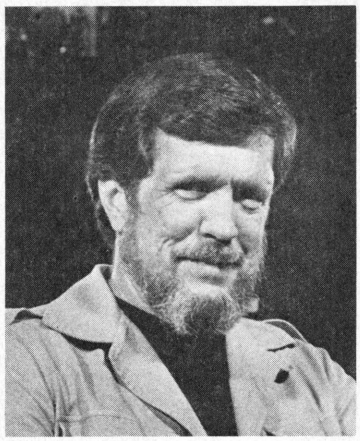
Some crucial decisions were made even before work began on either picture. "When we re-organized EEG, we luckily inherited the 65mm film format to create visual effects," says Edlund. "That gives us about a one-third larger image area to work with than the VistaVision format which we used at ILM."

That's no small consideration. When you are faced with optically compositing postage stamp-sized elements which will be blown up to 700 times the original size during theatrical projection, many passes through a printer, a 65mm original can give you just the edge that you need, particularly when it is critical for the audience to believe what they see.

However, this decision had major ramifications. One was that it required the design and development of some considerable one-of-a-kind equipment starting with a 65mm aerial image optical printer. Gene Whiteman, the chief engineer and Neil Krepela, matte department supervisor, were two of the earliest people on the scene, and the new optical printer was one of the first tasks they tackled.

It is built on a cast iron base, which "won't budge," in Edlund's words. "That's important because we have to be able to composite various elements within tolerances of 1/10,000th of an inch. We also needed an ability to do a lot of finesse work, which required precisely accurate electronic controls. And, it all had to be programmable. We wanted to be able to 'tell' the printer to automatically go to frame 144, print it four times, and then go back to frame 120 and print it, twice, and so on." All of these features were designed and developed by Jerry Jeffress and Kris Brown. The lenses are computer-designed to resolve about 300 line pairs per millimeter. David Grafton designed the lenses and Harold Johnson ground the glass using very exacting specifications for each element.

Though it is a precision instrument, the printer also has to be ruggedly reliable. "All of our eggs are in this one basket," Edlund emphasizes. "Just about every shot that we made flowed through this one funnel, including mattes and separations. Toward the end, we were shooting 10



Richard Edlund, ASC

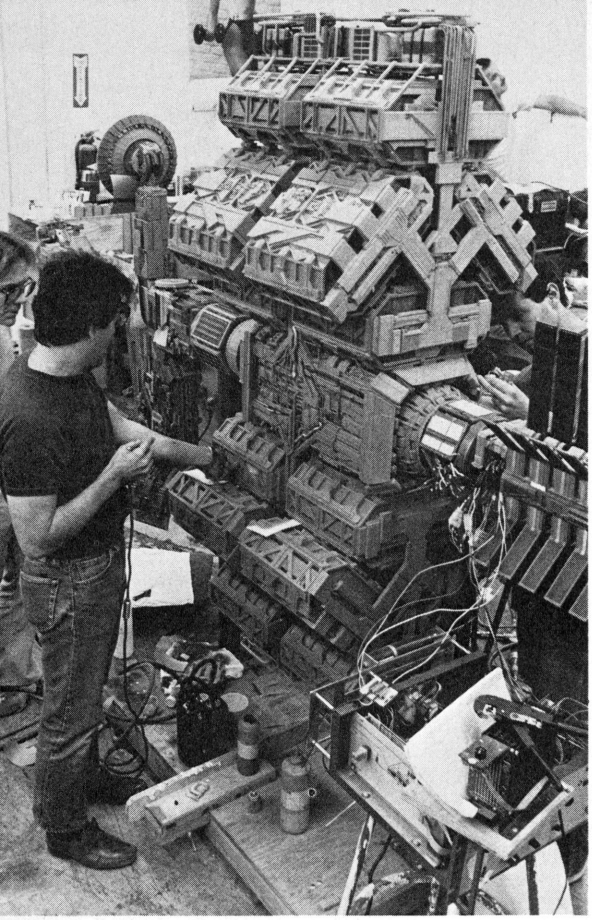
Richard Edlund is a native of Fargo, North Dakota. As a teenager, he took high school sports pictures, and he still grins while describing the thrill of having his pictures printed by the *Los Angeles Examiner* when he was only 15 years old.

He got his first filmmaking experience in the U.S. Navy, and credits a marine staff sergeant in the Fleet Air Photo Lab when he was stationed in Japan with steering him to the USC School of Cinema in 1961.

Two years later, he went to work for Joe Westheimer, ASC, who was running an optical shop in Hollywood. "That's where my real education began," he says. "Joe was willing to teach me what he knew. I also met many of the great cinematographers through him."

However, in 1968, Edlund dropped out of Hollywood. He spent the next five years taking still pictures of rock bands (including many album covers) and shooting experimental films. He also invented and sold a portable amplifier called "Pignose" which was used by tens of thousands of guitar players.

Edlund came back to Hollywood in 1973, initially to work for Bob Abel, who was doing some pioneering visual effects work with commercials. But, he hungered to work on a "meaningful" film. Two years later that opportunity finally came when George Lucas recruited Edlund for the *Star Wars* team. At the time, he thought that was the end of a long journey. However, it turned out to be just the beginning.



At work on the model of the Leonov.

complex composites a day. It never let us down."

"We also had to design and build a 65mm, rotary mirror reflex camera, the only one of its kind," says Edlund. Gene Whiteman, who heads the precision machine shop, along with Mike Bolles designed the camera.

The camera can shoot at speeds of up to 120 frames per second, though, to date, Edlund says that it has never been used at more than 100fps. That's because Edlund didn't want to chance burning out the movement. Not when the camera was needed daily during the crunch of production.

"We never seem to shoot at sound speed unless actors are involved," he says.

High speed was used to create the illusion of scale in miniatures in many cases, and also to extend the action. "When we were shooting images of the *Leonov* spaceship using Jupiter's atmosphere to brake, we needed composite footage of the flame caused by the atmospheric friction. Bill Neil shot the flame which our pyrotechnics expert, Thaine Morris, created on a crane at night in the parking lot at 100fps because that gave us the scale needed to make the fire look real. It also provided four times more flame footage than a sound speed shot would have, which gave Conrad Butt and Art Repola in the editorial department that much more to work with."

On this topic, Edlund feels that shooting miniatures is part art and part science. "There are formulas which we used to determine what frame rate to shoot at," he says. "For example, when we blew up the miniature building in *Ghostbusters,* we had to shoot that scene at just the right speed so that all of the flying bricks fell at a rate that would appear to be realistic."

However, there is also the matter of gut feelings. "There's just something inside of you which says that this shot is going to look better at 40 than it would at 45fps," says Edlund. It's partly experience and the rest is a second sense. It's how you 'see' the images in your head before you shoot the scene.

In contrast, shots of the models in deep space were made on a stage at approximately one fps. "We were on an 80 foot long track with a 200 pound motorized gearhead," Edlund explains. "If we shot at sound speed, we would have been dollying the camera so fast that it probably would have crashed through the back wall."

This technique also allowed Stewart and his crew, including John Fante and John Lambert, who shot the miniatures, to work at comparatively low light levels while stopped down to apertures as small as T-32. "The first law of shooting miniatures is that nothing can be out-of-focus," says Edlund. "This was a real challenge in that for the end of the picture we had some very complex landscape scenes, shot by Neil Krepela, where both the camera and the painted background were moving on tracks at the same time."

In comparison, Edlund remembers shooting a complex miniature scene for *The Empire Strikes Back* which required a half a million watts to light. That was the scene where the AT-AT Walker crashes and explodes. It was shot on a comparatively small 15 by 30 foot set, where the camera was literally backed up against the wall. "It would have really helped to have had a faster film," he recalls.

For *Ghostbusters* and *2010,* Edlund had that advantage. He recorded most miniatures on Eastman color high speed negative film 5294. "The faster film gave us close to a couple of stops of latitude," says Edlund, "and it is only subtly more grainy than Eastman color negative film 5247. The subtle difference in grain structure never proved to be a problem. In fact, because we were originating on 65mm film under perfectly controlled lighting conditions, when Mark Vargo then printed down to 35mm anamorphic composite dupes, our images sometimes looked too sharp compared to the live-action 35mm original negative. In these instances, Mark actually had to compensate by increasing contrast and slightly degrading the effects footage when composites were made."

Another tool built, or in this case rebuilt, by EEG is an Oxberry animation stand. The new stand has a rotating, motorized table, which is completely computer-controlled and has interchangeable lenses. Every shot is totally repeatable. There is an 18-by-24 inch back-lit field. This allows the use of animation cels which are four times the conventional size. "Gary Waller and Terry Windell are able to shoot absolutely pristine images with this stand," Edlund says.

Among the other new tools designed and built for *Ghostbusters* and *2010* are a state-of-the-art motion control system, a 40-inch submersible snorkel lens used with the "cloud tank," a computerized exposure control system for use with the Compsy matte camera, and a 12-by-36 foot blue screen.

Motion control, of course, is the bread-and-butter of most visual effects houses, and Edlund believes that Jeffress has no peers when it comes to designing electronic systems for this purpose. "The original motion control system which he (Jeffress) built for *Close Encounters of the Third Kind* around 1975 is still usable and loved by Dave Stewart; all you have to do is give it a kick in the right place," says Edlund.

However, during the past eight years motion control systems have become increasingly more sophisticated with the evolution of more powerful software, and, at the same time, less expensive as microprocessors have become more affordable. "What we have now is a much better device. It is easier to use, more reliable and flexible, and it also cost less," Edlund says.

A lot less. The current motion control system is now in its second generation, and it would cost approximately $20,000 to design and build a clone of it. Edlund believes that this is important because it provides a lot of flexibility for taking advantage of new technology to meet new challenges at reasonable costs. His point is that if you spend a half a million dollars for a motion control system, or for other hardware, there is a temptation to keep using it to justify your investment. "If you do that you end up with similar looks for different pictures," he says.

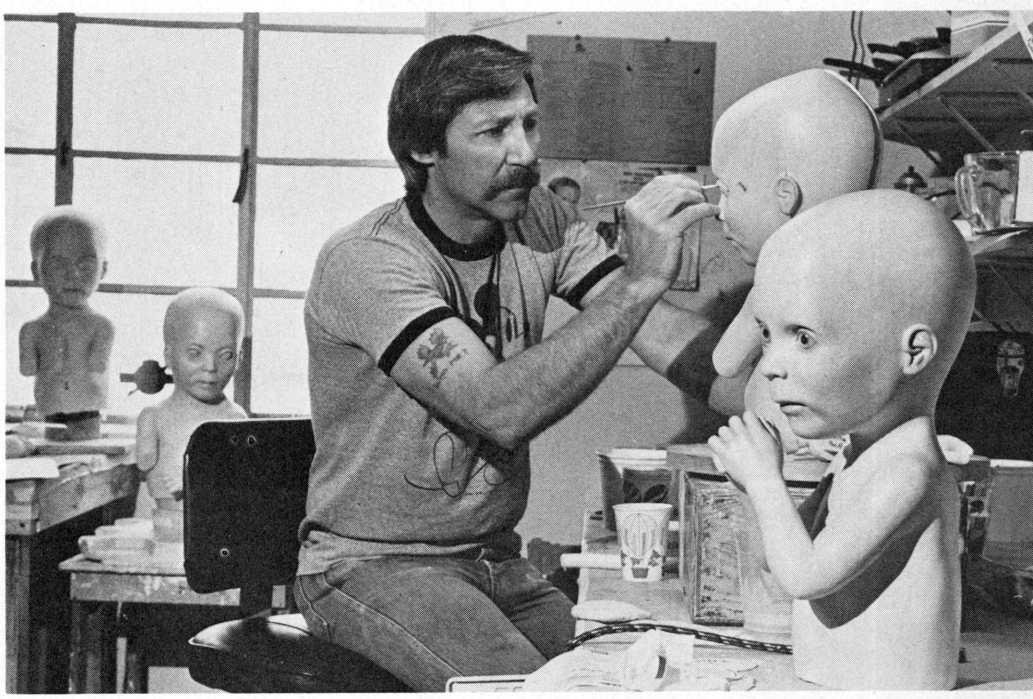
Edlund is also obviously very sensitive to the issue of costs. He believes that some decision makers in the film industry still need to be convinced that they can buy high quality visual effects without gambling. He works hard to be part of this educational process because it could affect how some pictures are made, and in some cases, even if they are made.

"Sure, we sank some dry wells," Edlund admits, "however, on balance, I believe that we have been very frugal. There haven't been any surprises. And, I believe that we have learned a lot in the process. As a result, we have put some new arrows in our quiver."

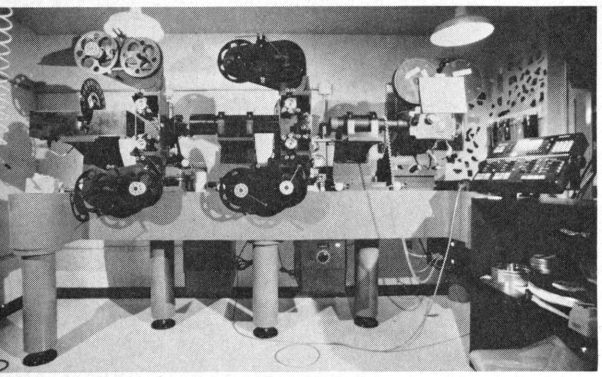
Production designer Albert Brenner with an early mockup of the Leonov which he is comparing to a model of the Discovery for scale. The Discovery had to be reconstructed by analyzing film clips from 2001 since the original had not been preserved.

Among the new creative tools are the cloud tank and the snorkel lens with the 40-inch extension. He refers to Gary Platek as "the master of the cloud tank."

The latter is capable of containing almost 2000 gallons of liquid. By using alternate layers of fresh and heavier salt water, dyes and pigments can be isolated to create a variety of effects. Conventional lamps are precisely positioned to introduce varied lighting effects. As one example, the cloud tank was used to create the illusion of wind shears and other dynamic actions on Jupiter's surface and atmosphere. "We used a few lenses from my collection," says Edlund, who has gathered more than 100 lenses for just such an eventuality," and created a 40-inch snorkel extension. This allowed us to move the lens to where we wanted it in the tank, shooting underwater, to create the right illusion." This too, is a good example, of how creative visual ef-



Lance Anderson painting eyes on a Starchild.



The 65mm aerial image optical printer designed by Gene Whiteman with electronics by Jerry Jeffress and Kris Brown and optics by David Grafton and Harold Johnson.

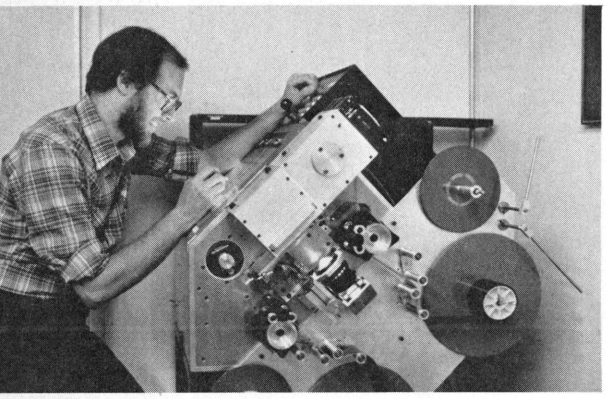
fects require a unique synergy of technology and innate sense for what looks right.

"You can't learn how to use the cloud tank by reading a manual," says Edlund. "Gary has developed a feel for it."

A five watt argon laser equipped with multi-color attachments adds another dimension to Platek's bag of tricks. He can shoot a precisely focused beam of colored light into various gases for a stunning array of effects.

Another ramification of the decision to originate visual effects in the 65mm format was the need for a series of special order films. "We could not have made this picture without Kodak," says Edlund. "No one keeps 65mm film in inventory, and we needed a long list of special purpose emulsions, all on critical deadlines, and most of it had to be on Estar base. It had to be made for us."

The Estar base is more durable and dimensionally stable than the acetate backing used to manufacture conventional film, and this provided a critical advantage. "In many cases, we were making optical composites by combining elements which were produced months apart," he says. Normally, this wouldn't be something to worry about, however, when you are making optical composites using a variety of mattes and masks as well as fragments of frames, even minute differences in shrinkage can cause problems for Vargo in getting the right matte fit when composites are made. Edlund says that there were no such problems with the Estar based films.



Marty November uses a custom 65mm viewer and a field chart to check relative positions of two elements to be composited.

Also, Edlund notes that the visual effects exposed on 65mm format Eastman color negative film on Estar base matched perfectly with the conventional 35mm Eastman color footage exposed by Hyams. "We had few problems matching colors or contrast," says Edlund.

Edlund opts for a rich, full negative whenever he can get it. "When we were shooting plates, I worked at the same printing light as Peter, only we were about a ¼-stop 'hotter,' " he says. "If he were rating 5294 for an exposure index of 800, we shot the same scene at 600 for the same print light."

His reasoning should be obvious. "Anytime you are creating visual effects, you want to begin with the best possible negative because you are going to amplify image problems with each succeeding generation," he points out.

Among the special-order films used by EEG were Eastman color negative film 5247, Eastman color high speed negative film 5294, Eastman technical pan film 2415 (for special applications and separations), Eastman high contrast pan intermediate SO-331 film (a high-contrast black-and-white film with better resolution and slightly lower gamma than 5369), Eastman color print film 5384, and Eastman color LC print film 5380.

The 5247 emulsion was used for all daylight plate production, for all original blue screen photography—which was used to produce inserts for all of the many video monitors included in scenes as well as for three or four close-in shots—for shooting painted mattes, and in a few other instances where Edlund wanted super-fine grain.

The high-speed negative was used for much of the miniatures photography, as well as in other situations where reduced light levels and depth-of-field were requisites. The group used 2415 technical pan film for some of the matte work. "This is a high gamma film which is very sensitive in the red area," says Edlund. "However, if you are duping from separations onto 5247, you want that high-contrast-level that you get from 2415."

Edlund notes that the 2415 emulsion also processes considerably faster than Eastman panchromatic separation film 5235, which is more typically used in this application, and it is also finer grained. EEG installed a Treise processor that the company uses for all separations and mattes. "We maintained very tight sensitometric and densitometric controls, and also processed each separation for the gamma recommended by Kodak," says Edlund.

Edlund notes that some labs will choose a compromise gamma so all three separations can be processed the same way. "I think that you lose more than just a bit of sharpness and color rendition by doing this," he says.

The two print films were used to record positive elements for optical shots. This required some inventiveness. EEG needed 65mm film for its opticals, so Whiteman designed and built a slitter which trimmed 2.5 millimeters from each edge of the 70mm print stocks.

Edlund explains that the 5384 emulsion allows "an incredibly high D-max of about three" with harder edge characteristics. In contrast, the LC print film is designed for television transmission and for use as an intermediate for transferring film images to video tape. It has about a 15 percent lower range of upper gray

scale contrast. "The LC print was ideal for both dark rear projection scenes and for situations encompassing bright objects, where we needed a dense matte with soft edges," says Edlund.

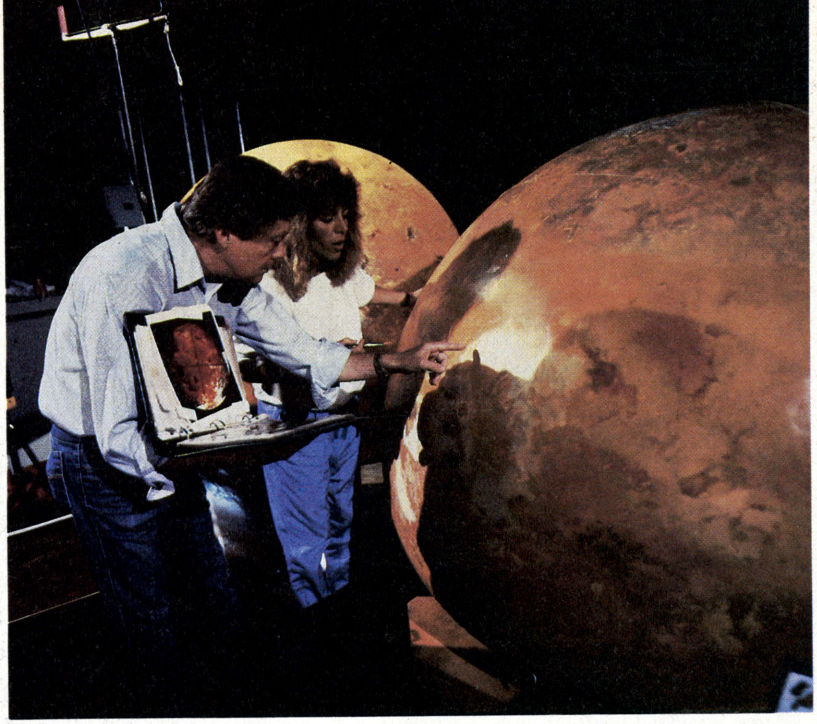
"We used 5247 to shoot many of the 40 painted mattes created by Matt (Yuricich)," says Edlund. "For example, all of the monolith images were painted. We considered shooting these scenes with a miniature, Neil Krepela, matte department supervisor, felt that paintings would look better.

Another difficult challenge both technically and creatively was Jupiter. "That's the signature for the entire picture," Edlund feels. Richard Terrile, an astronomer who works for jet Propulsion Laboratories, in Pasadena, provided astute technical advice concerning the Jupiter look, as well as proving to be a valued liaison with NASA, in obtaining actual Voyager data bases.

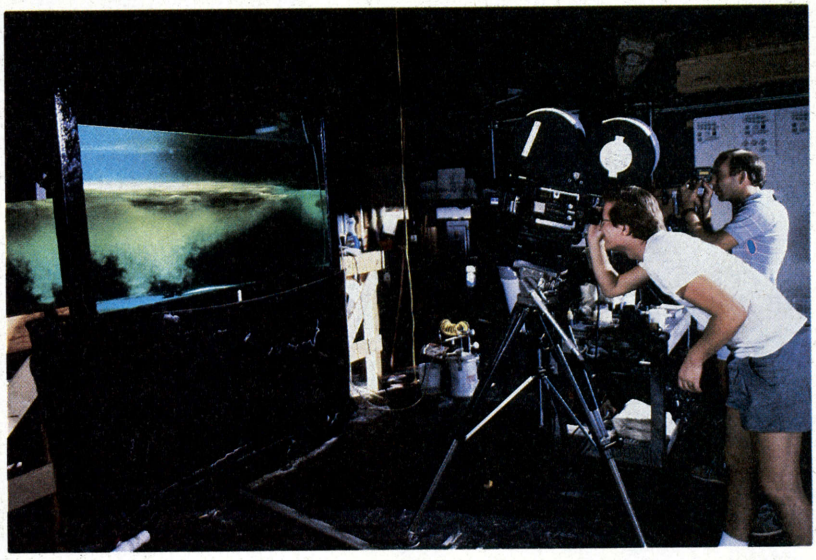
"Jupiter presented us with an interesting challenge in that the images which the public has seen on television and in print were collected by sensors onboard the Voyager 2 spaceship while it was hundreds of thousands of miles away from that planet and millions of miles from Earth," he says. The imagery was somewhat distorted by Jupiter's atmosphere and by space "noise," or radio interference.

"What the public saw in print and on TV was a comparatively low resolution, highly processed image which wasn't quite the right shape," he says. "However, we tend to accept this type of an imperfect image on television and in print because it is what we expect. In comparison, we know that people are used to looking at movies in a different way. Reality in a theater is seen through the eye of a film camera. And, so it was essential for us to create a much more believable and dynamic Jupiter than the public had seen so far."

Peter Hyams believed that if everything else was done right, and Jupiter was wrong,

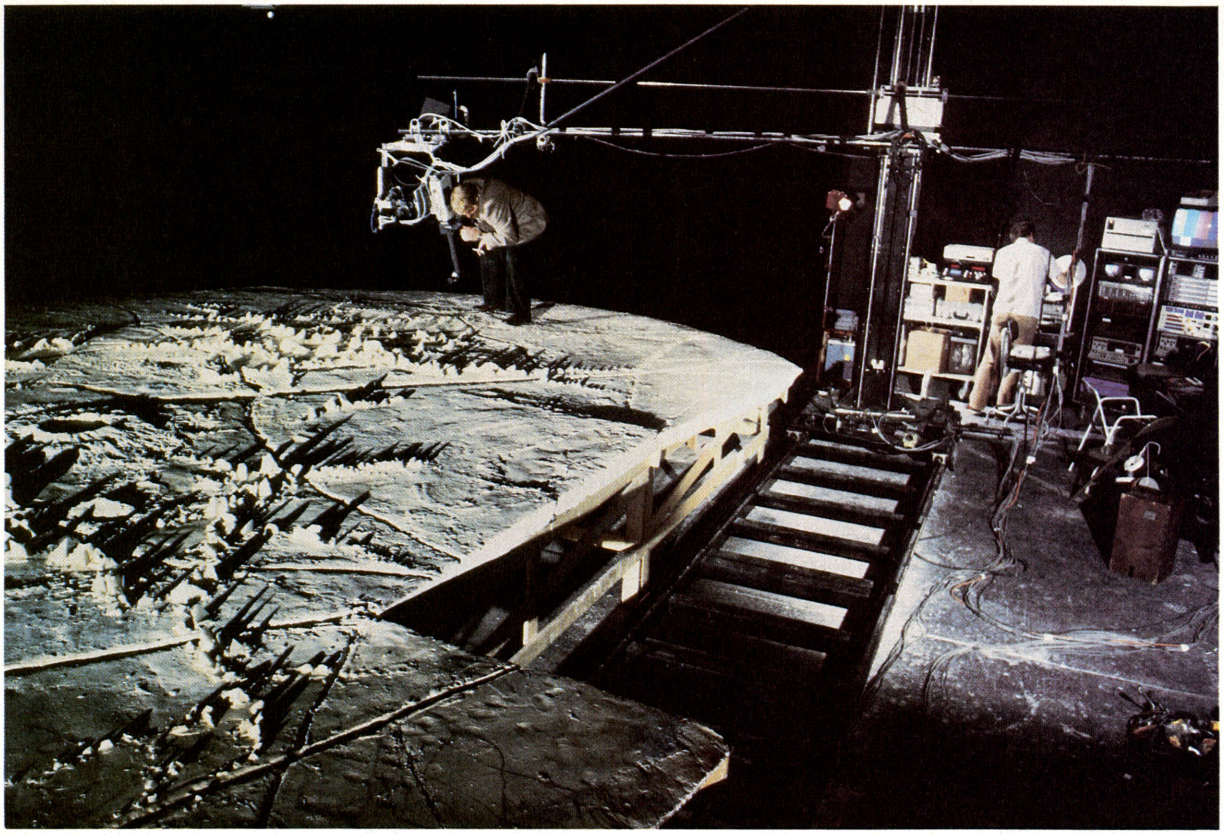


George Jenson and Michelle Moen discuss the surface features of Io.

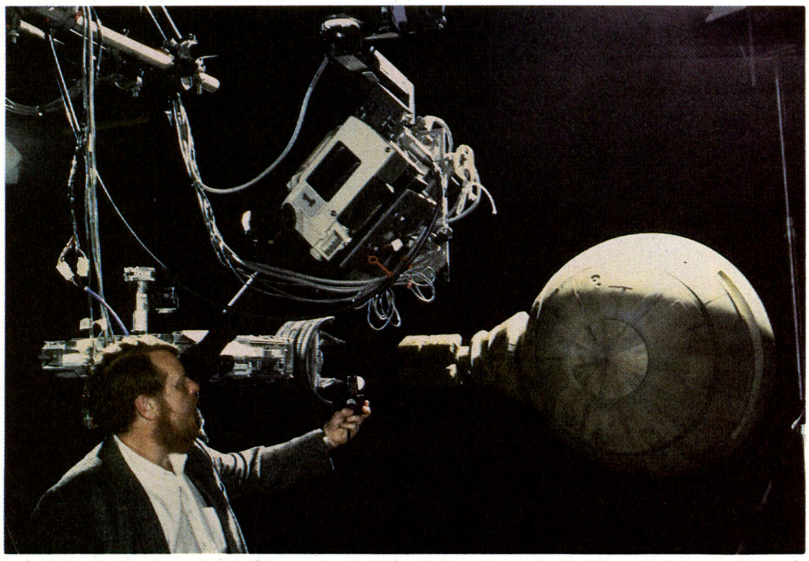


Gary Platek and Pete Romano set up a show using the cloud tank which holds almost 2000 gallons.

Neil Krepela and Michelle Moen arrange a shot of th tabletop Europa landscape for the final sequence. Several passes were composited in the camera to achieve the effect.



Dave Stewart sets up a video stop motion shot of the surface of Europa using a snorkel lens.



Video motion control shots were recorded single frame and played back at 24 fps on monitors in the Leonov set.

2010 just wouldn't work. So, enormous creative energy was poured into this task, including quite a bit of personal research by various members of the Entertainment Effects Group.

With Terrile's assistance and an open door at JPL, they developed a concept for the Jupiter look. JPL provided a snakeskin, a sort of mercatorized strip of the planet's surface, which was created from computer-enhanced imagery collected by Voyager 2's photo sensors. The snakeskin was scanned and converted to machine-readable data which was fed to a Cray super-computer at Digital Productions, in Los Angeles.

Gary Demos and Jon Whitney, at Digital, assigned Craig Upson to work closely with Hyams and Edlund on this part of the project. "Image processing is a very effective way to take digital information like we had, and with the aid of algorithms and computer programs to convert it into a photographable digital display of the planet," says Edlund.

However, it is also relatively expensive. It took nearly the entire capacity of the Cray computer to process each frame. Using close-in, higher resolution images provided by NASA as a reference, the snakeskin was repainted faithfully by airbrush artist Ron Gress, rephotographed and then redigitized. "I wanted as little 'noise,' or grain, as possible," Edlund explains.

"We provided Digital with a 65mm camera which has a rock-steady movement, and it was fitted with a crystal sharp Hasselblad lens," says Edlund.

Three overlapping VistaVision frames were used to record each of 12 different 65mm Jupiter elements required for the film. The three elements making up each image were then digitally

spliced to equal the resolution required for the 65mm format.

Surface dynamics simulating wind swirls and shears moving simultaneously in different directions, and the red spot vortex were simulated digitally also.

"This is all very subjective," Edlund admits. "When you generate the wind shears, red spot vortex and other flow patterns and they look too fast or too slow, it doesn't ring true. You need just the right scale and balance."

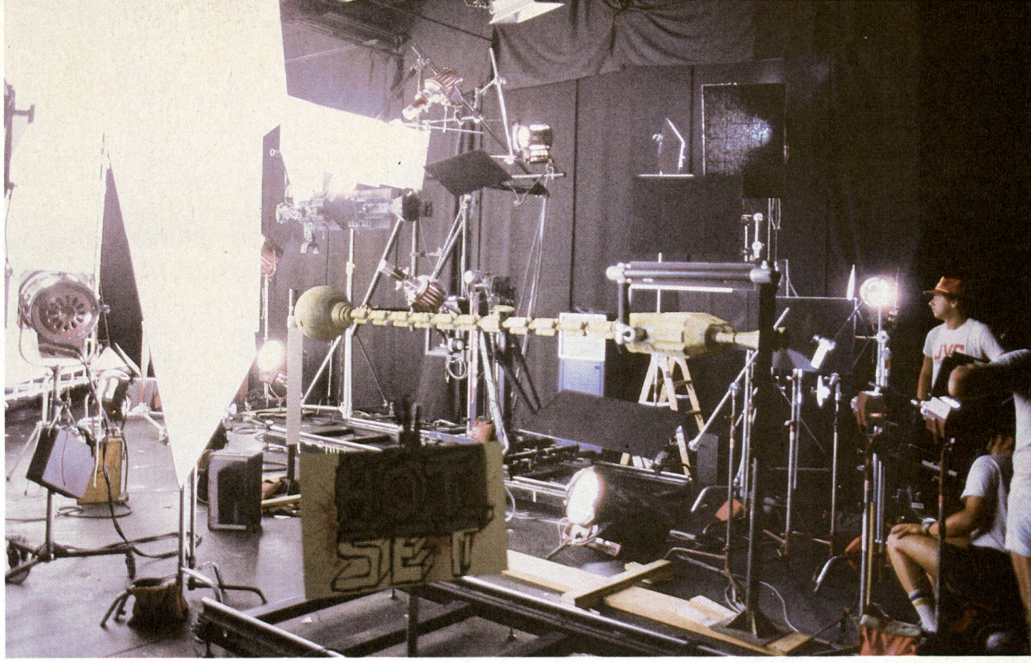
Surprisingly, Edlund says that the most difficult aspect of this exercise was cultural. "We are people who are used to thinking in terms of traditional visual effects trying to explain what we wanted to the digital people who are more oriented toward mathematics and software. However, we learned a lot and came out of this digital imaging process with some very interesting, in fact, mind-boggling shots."

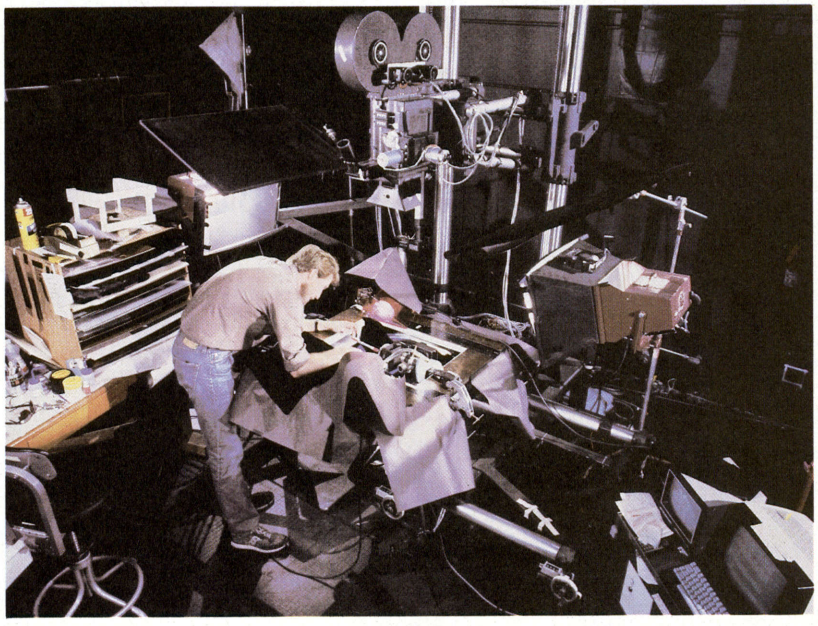
Part of the visual effects job involved finding short cuts that worked. For example, EEG avoided a very difficult miniature shot by painting a matte of the *Discovery* and framing it with a mock up of a hatch onboard the *Leonov*.

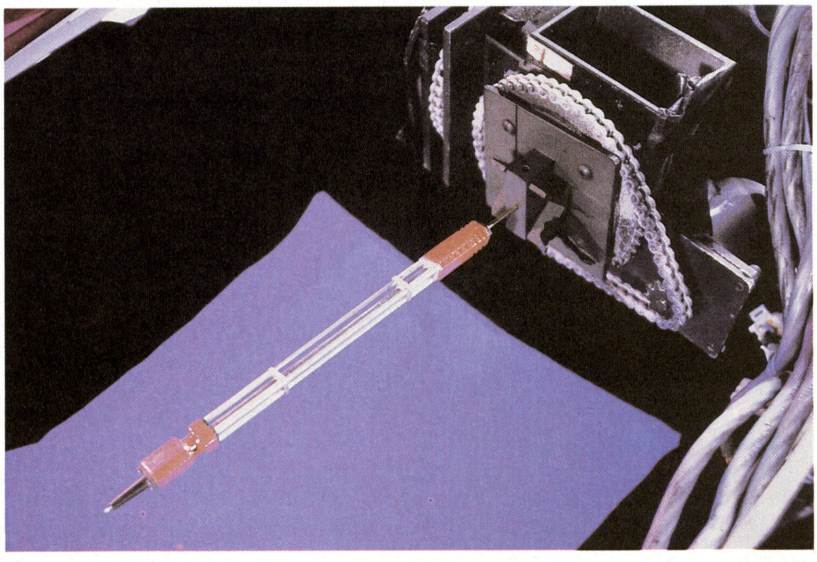
However, sometimes there were no short cuts possible. There is a striking series of scenes which show the world changing by the appearance of a second sun in the sky. "Our job was to create a montage made up of picture postcard images of the double suns rising or setting in some of the major cities of the world," says Edlund.

A four-person crew headed by Bill Neil replicated the same scene in Paris, New York, London, Cairo and Rome. Neil adherred to fairly strict parameters, which included shooting each location at sunset or sunup, and using a 200mm lens to make one sun appear larger. The second sun was later optically composited.

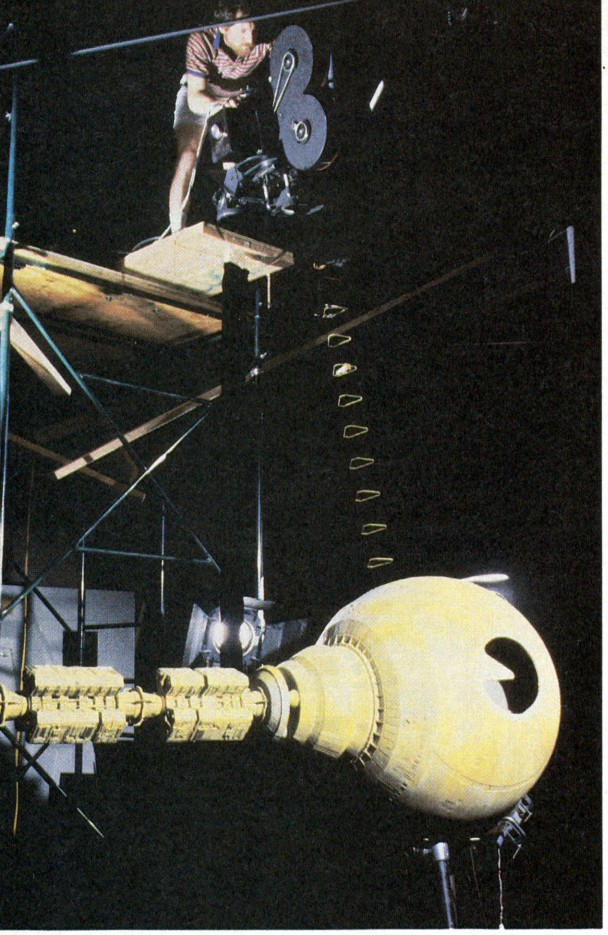
The only hitch in this scenario occurred in Rome, where the hills in the background made it







Above: ***Motion control shots were often filmed at T-32 to permit sufficient depth of field.*** **Left:** ***Gary Waller uses the 65mm customized Oxberry animation stand with a computerized rotating table and an 18" x 24" backlit field to shoot a blue screen miniature.*** **Bottom:** ***The floating ballpoint pen was shot using motion control to animate the pen on the Oxberry stand against a backlit bluescreen.***



John Fante shooting a POV shot of the discovery for the boarding sequence.

difficult to exactly match the parameters followed in the other cities. Then, there was Moscow. "We needed a scene shot in Red Square to complete the montage," says Edlund.

With not enough time to obtain permission to shoot in Red Square, Matt Yuricich created a matte painting which Neil Krepela filmed. "The onus was on us to make it work. The painting had to be as realistic as the live-action scenes photographed in the other cities," says Edlund. This was no small task, since the live-action scenes it had to match look so good. The illusion of the matte was enhanced by rear projecting smoke pouring from stacks in the painting of Red Square.

What is the most complex visual effects scene in the movie?

"Maybe the last one," Edlund answers. This is the scene where Jupiter becomes a new sun, and Europa develops life forms. After much experimentation, it was decided to shoot Europa's changes as tabletop miniatures, shot by Krepela, Stewart and Jensen. In the final shot, the camera tracks along the tabletop and in the background is a 35-foot long painting, which is also on track. The sunlight comes through holes in the painting.

Krepela shot a very slow truck along the edge of the table, covering 30 feet of track. Meanwhile, the painting was moved in precise lockstep. Since the miniature landscape isn't moving the camera is on a pan-head so it can be positioned at angles which suggest inifity.

"This is where sophisticated motion control really comes into play," says Edlund. "Krepela had to program both the camera and background trucks in conjunction with the pan-head with zero margin for error."

Other elements required to make the shot included the use of smoke, such devices as cotton balls and bridal veil diffusion sheets with very precisely controlled lighting, all of which created an illusion which was strong enough for Hyams to use as the last shot in *2010*.

By the very nature of a project like this, there have to be unsung heroes for it to succeed. "There are no awards given to rotoscope operators," says Edlund, "because if they do their job right, no one knows they were there. I think that Annick Therrien is the best. Other key players on the *2010* visual effects crew include key special effects man and overall facility logistics manager (as well as master pyrotechnician) Thaine Morris and his assistants, Bob Cole and Bob Spurlock; Bruno George who created all the optical mattes for Vargo's peerless composites, optical operator Chuck Cowles who also shot many composites, still photographer Virgil Mirano, key camera assistants Alan Harding and Pete Romano, Bess Wiley, and Laura Buff's assistant, Claire Wilson.

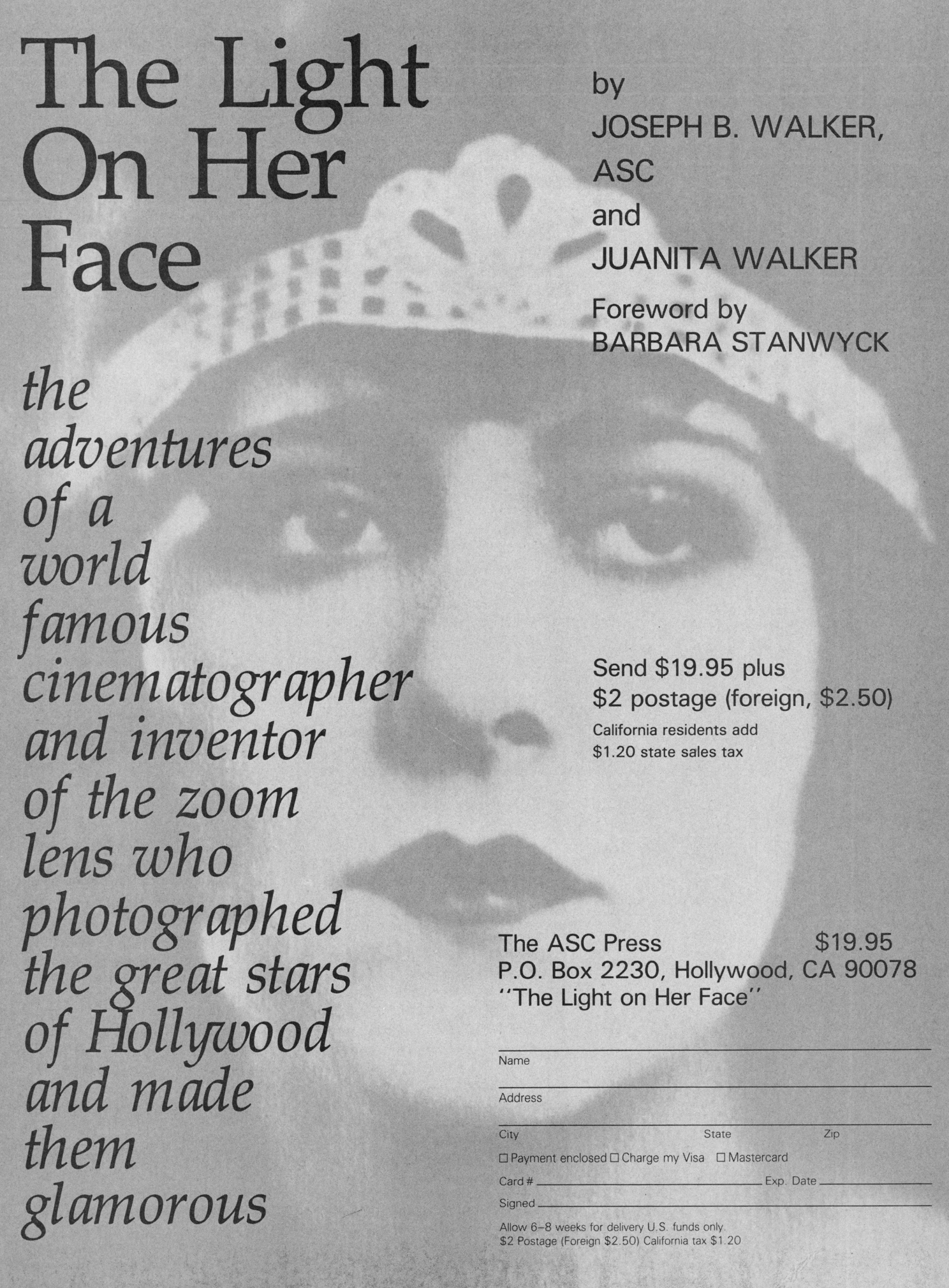
Is this the ultimate in visual effects?

Not by a long-shot. Edlund is already focused on the future. He believes that the evolution taking place in the broadcasting industry, which includes improved receivers with digitally enhanced images, bigger, better screens, stereo sound, more choices with cable and pay-for-view channels, and video cassette recorders which allow people to do their own programming will all combine to spark some significant changes in the theatrical film industry. "I believe that Doug (Trumbull) is on the right track with Showscan," he says. "We are going to need big theaters, which are well-maintained, with stereo sound, and, of course, entertaining movies."

Given these parameters, Edlund is certain that the public won't curtail its movie-going habit. "You don't stay home to watch the world series on television if you can go to the stadium," he says. "Interactions with a crowd are a basic part of the human experience which make movies wonderful. And there is the look of film on the big screen which provides a much more acute sense of reality than the best television images."

Edlund, who identifies himself as a cinematographer, believes that in support of all of this, visual effects technology, and its artistry, will continue to advance at a very rapid rate. He believes that the next decade could be even more exciting than the past one. And, that is saying a great deal.

Besides better technology, a big part is the growing pool of talented and experienced people working in this field. When Edlund started on *Star Wars* less than 10 years ago, it was a learning experience for just about everyone involved in that landmark film. "We had to recruit and train many people from scratch," he remembers. "When we started *2010*, there was a much wider, deeper pool of talent to choose from. And, we keep learning. I think that we know a lot more today than we did before we started *2010*, and that has to help on our next picture, and the one afterwards." ■



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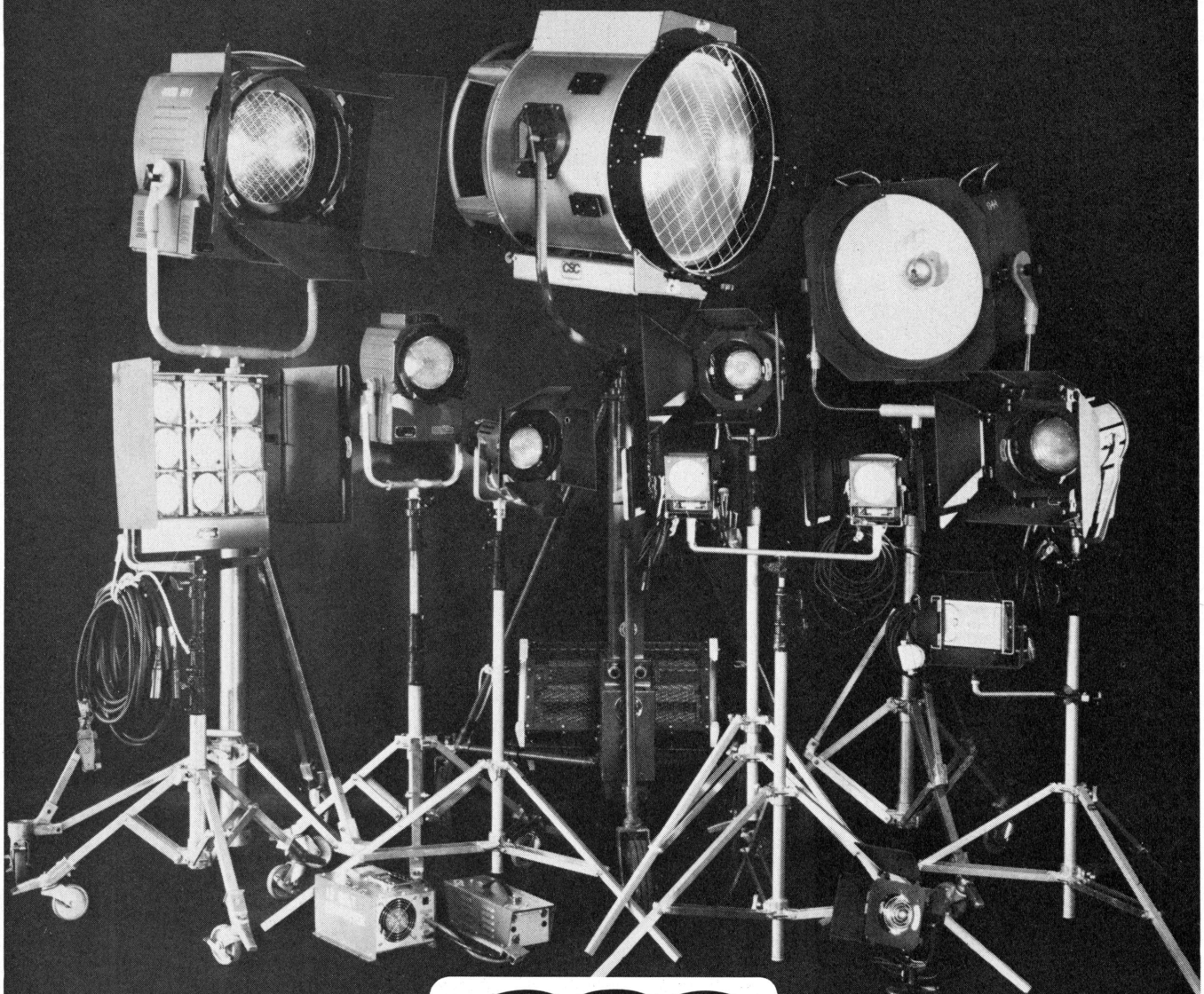

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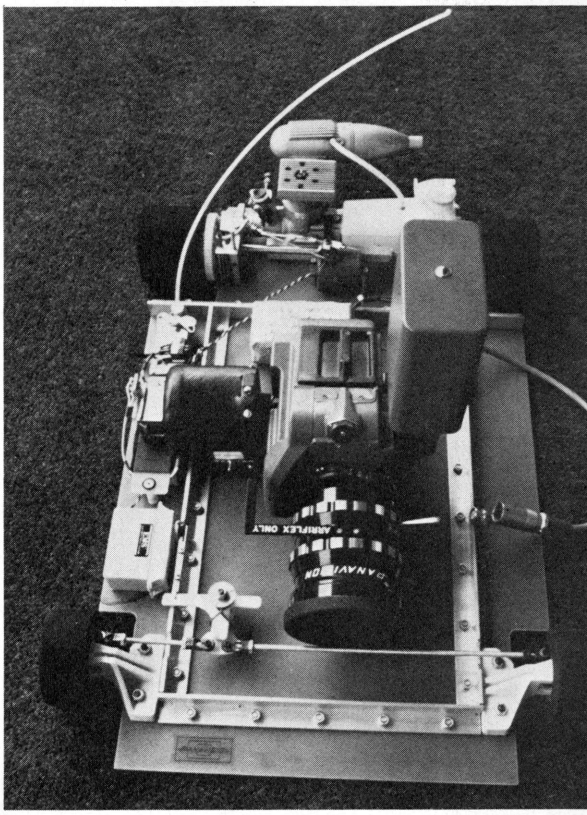
New Camera Technology for *Runaway*

High technology on the set for use in producing a high-tech futuristic motion picture—an appropriate match-up and one that John Alonzo, ASC, cherishes. He employs a good many of the latest and best high-tech devices as director of photography on *Runaway*, an action thriller set in the future.

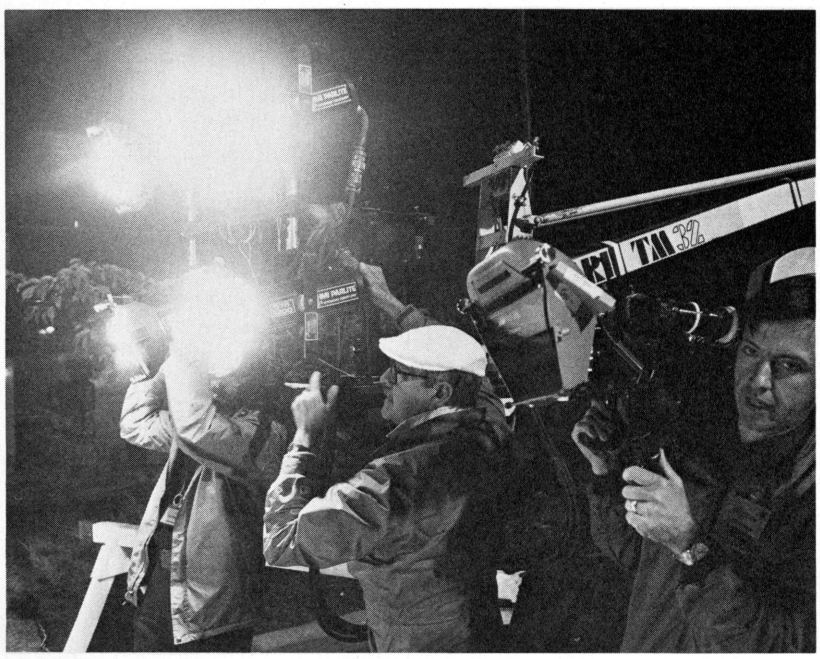
Written and directed by Michael Crichton and starring Tom Selleck, *Runaway* was shot in Vancouver, Canada. While shooting *Runaway*, Alonzo and Crichton looked for ways to integrate the technology that Crichton as screenwriter had created for the picture—deadly miniature robots, remote controlled cars and a hand-fired heat-seeking missile.

Alonzo says, "I looked at *Runaway* as 'science truth' rather than science fiction in that Crichton's designs are based on actual things that are practical and can be done now, if someone wants to put the time and money into them. The computers we used are already in exisitence and I understand that the hand-fired missile has been made, believe it or not, in China. It's bulky and not very practical, but it does exist."

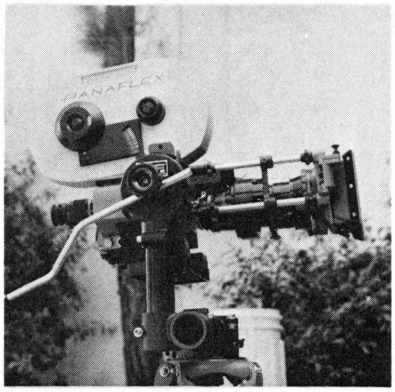
Luther, the villain of *Runaway*, played by Gene Simmons of the rock band Kiss, uses the miniature robots to track his quarry. Crichton wanted to get the point of view of the tiny, ground level objects. Jack Barber and Gary Slayton of Panavision built a "toy" for Alonzo, a special low-configuration camera. Slayton and Barber adapted an Arriflex 2-C with a techniscope movement, reducing the weight of the camera and creating a significantly lower profile by mounting the magazine horizontial to the ground. This was done by building a special throat through which the film is twisted as it is pulled from the magazine into the camera. "It was a huge machine shop effort," says Alonzo, "and Panavision turned it out in record time."

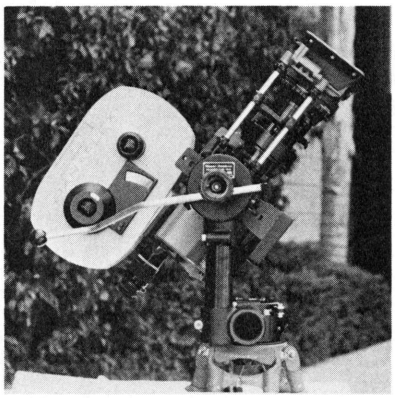


Panavision's adaptation of the Arriflex 2-C mounte on a mini race car.



Slayton, a mini race car enthusiast, tried mounting the camera on a small car driven by a model helicopter engine that he and a friend built. The car, approximately 2 feet long and 1½ feet wide, has an extra-wide wheel base and a ¼″ ground clearance. The camera's low profile put the lens just 2½″ off the ground. "So," says Alonzo, "It was really very, very low. Electronically controlled miniature batteries drive the camera, roll the camera on command and manuever the car."





The Weaver-Steadman tripod head.

Panavision's innovation proved to be a very successful case of adapting technology to meet the requirements of the script. Because he was shooting in Techniscope, Alonzo was not limited to the use of anamorphic lenses. He used a spherical wide angle lens (9.8mm) which gave the illusion of traveling at very high speeds, though the car's actual maximum speed was only 35 miles an hour. "We were able to maneuver the little cars under and around automobiles—fast," he explains, "so, we got the point of view of the objects following our heroes. Then later the camera took on the point of view of a different object, the hand-fired missile that's like a bullet going through space."

Alonzo used the camera in other situations as well. "We put it on the Steadicam and sent the operator racing through a crowd. It's a horrendous shot, kind of like the motorcycle thing in *Return of the Jedi,* except this was done live, without opticals."

Another of Alonzo's "toys," was the Weaver-Steadman fluid balanced tripod head, which he had used in previous productions. "I love the Weaver-Steadman head because it cradles the camera and keeps the lens in the same nodal point. The best thing about it is you can tilt it straight up, if you want to, and straight down. When I first used it, on *The Fortune,* the Panaflex didn't fit the Weaver-Steadman. But that's no longer true. The next time we got involved with it was on *Blue Thunder,* where we had all these shots in the city, having to shoot straight up at the helicopters. It's really tough with most other heads to do that—and to do it well—because when you get to the top, the head binds. We also used it to do 360s. I put it on sideways to do a 360-degree spin with Roy Scheider in the helicopter.

On *Runaway*, Alonzo put the Panaflex on the Weaver-Steadman head in order to heighten the drama of a chase sequence on an 80-story skyscraper in which Ramsay (Tom Selleck), a cop with a severe case of acrophobia, finds himself in a construction elevator on the top of the building. Ramsay's POV—as he crawls to the edge of the elevator and, horrified, looks straight down—was achieved because of the head's extreme tilt capabilities. Rather than put Selleck and an entire crew through that ordeal, however, Alonzo first shot a process plate on the top of a Vancouver skyscraper, using the Weaver Steadman head, then later filmed Selleck in the elevator car in the studio.

HMI Parlites with the solid state electronic ballast.

"Shooting on top of the building, we had the camera facing out and then it tips way down, practically perpendicular. We just suspended it out. The shot had to be very, very smooth for coordination. The head was ideal, because the lens stays in the same nodal point. Then in the live shot of Selleck in the elevator, with the process plate in the background, the plate tips down as he crawls towards the edge of the elevator. Later we used the head again, this time to make it look like the camera has crawled over him to see down.

"The head was very good for other purposes, too. We could turn the camera upside down, and operate it practically and without difficulty. You just flip the camera around. We did some special gags with it, where, instead of turning the entire set upside down, the camera turns upside down, giving the illusion that the set is turning. In chasing some miniature robots that we were trying to make walk up walls, it was much easier to "tilt" the wall. Although the head is large, we found it very easy to use."

A particular challenge for Alonzo was an exterior night scene in which a murder and subsequent hunt for the killer takes place. Crichton wanted an eerie effect of searchlights from a hovering helicopter to penetrate the entire scene, revealing every detail, thus making the murderer's escape impossible. Because it was a long sequence, Alonzo hoped to avoid the problems entailed with using the helicopter. He looked around for another lighting device that would infuse the area with light and at the same time produce the ominous feel the director wanted from the helicopter.

Prior to production, Alonzo had seen Strand-Century's prototypes for new HMI ParLites and liked the look of them. So,

instead of the helicopter, Alonzo conceived an enormous structure, mounted with searchlights, that resembles a huge preying mantis, rising up in the air and rotating back and forth. The special effects men designed a motor that rotated the lights, "which," says Alonzo, "made them very evil looking." Then he found a miniature crane used for telephone work in Canada. "The crane looks just like a giant preying mantis, with a skinny little neck that breaks in half and has four little wheels and outriggers. This thing lifts into the sky, straightens out and gets to do its act."

Then, the HMI ParLites, which began as a prop for Alonzo, became valuable as production equipment. When he tried the ParLites to light the interior of the house on the night murder location, they proved to be extremely good, operating without any flicker problems. So he also used them all through shooting the miniatures of the giant construction set where they provided a powerful, penetrating light, the result of Strand-Century's electronic ballast, which provides a 100% light wave level with only a 2.8% variation.

The ParLites saved valuable production time because of the lightweight, solid state electronic ballast and its instantaneous start and re-start capability. "It's not that I used less light, Alonzo says, "I used more *little* lights. The old techniques required large units, 5 or 10K's, which take time and manpower to move around. With the small units, I had the flexibility to 'paint' more."

Another device that keyed into saving time and money, even as it increased flexibility, is the Lightflex system. Invented by cinematographer Gerry Turpin, BSC, Lightflex stretches the toe of the film stock's gamma, activating the latent image, so that far more shadow detail is picked up. "I think Lightflex is a very good toy," Alonzo says. "You just put it on the camera, look through the lens and bring up the amount of light you want. And, because the Light-

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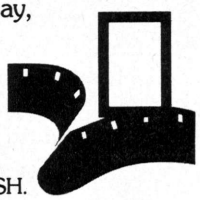

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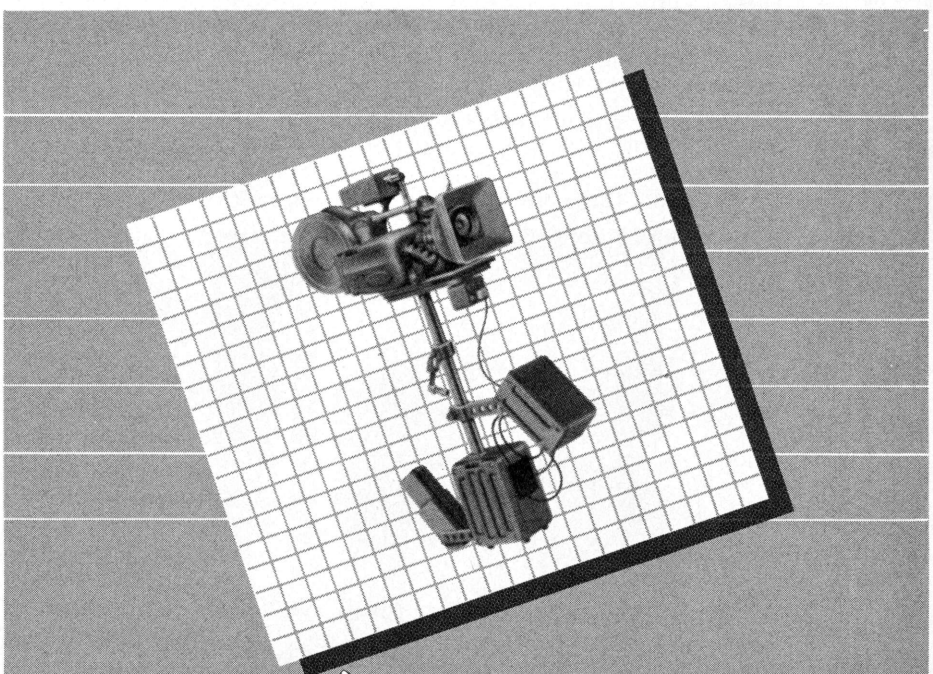

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flex brings up shadows, we could get away with less light."

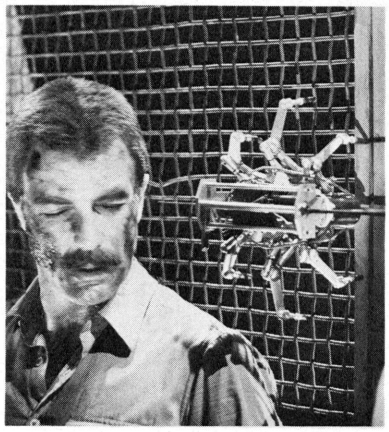
Unlike pre-or post-flashing film in the lab, the Lightflex system is mounted on the camera in front of the lens, providing a "sourceless" fill by reflecting light back into the lens during filming. The cameraman dials in as much or as little Lightflex activation as the esthetics of the scene require. British cinematographer Turpin initially developed the sytem for *Young Winston* in 1972, and received an award for technical achievement for his work from the Academy of Motion Picture Arts and Sciences in 1984.

Alonzo and Crichton wanted to emphasize the hi-tech, future-time setting of *Runaway*. "To me," says Alonzo, "*Runaway* is not futuristic exactly, but rather Crichton's vision of what might be the future. The buildings have a certain sterility, yet they contain period furniture. Crichton sort of subtly threw it away, using a different kind of telephone, a computer no one's seen. Yet, he gave Selleck a traditional, numeral-faced watch."

The Lightflex, along with high-speed Fuji film, which Alonzo rated at 600-800 E.I., helped to created the atmosphere he and Crichton wanted. He says, "It's a different look in the sense that it's not diffused. It's very sharp, very crisp, but with low color contrasts, no contrast between red and blue, but more of a pastel quality." Alonzo has handled other films differently. For example, he have *Norma Rae*, a hard, almost grainy documentary look, "It had to look that way. I forced the film on purpose, just to deteriorate it, give it a dusty look."

To balance the HMI ParLites, which are very blue, Alonzo, in consultation with Marty Conn, president of Lightflex of America, Inc. came up with the idea of using an EF top filter tray pack for the system. Alonzo says, "Then, with the HMI's real daylight color more or less corrected, I got a strange,quasi-daylight look which adds just the right dimension to Crichton's vision."

Alonzo also used the Lightflex for color contrast in the process photography for the shots on top of the skyscraper. According to Marty Conn, this is one of the first times the device was used in process work. An additional advantage with Lightflex is that heat fatigue from the lights is minimized for the actors. Tom Selleck was so impressed with this aspect that he's asked the producers of *Magnum P.I.* to look into using it. Alonzo plans to use Lightflex on his next picture, *Jo-Jo Dancer, Your Life Is Calling*, which Richard Pryor will direct.

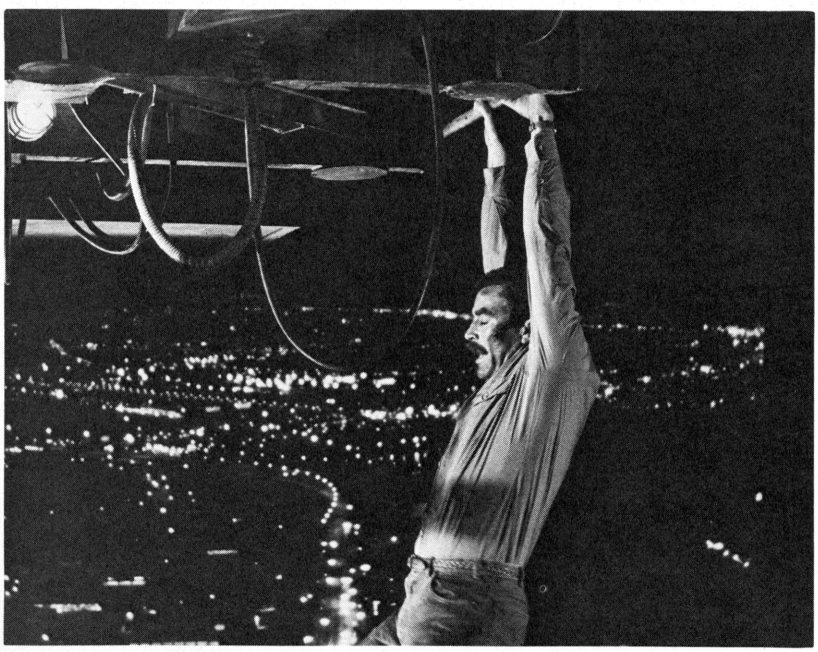


Tom Selleck is attacked by a high-tech minature robot.

Alonzo's "toys" used on *Runaway* served another important purpose as well: saving money. Since the Lightflex reduced lighting requirements, Alonzo could make maximum use of the ParLites. "It was faster," he says. "One guy could move them." The cost of opticals was reduced by using Panavision's specially adapted camera, because Alonzo could shoot in 2-perf Techniscope, then make a direct proportional blow-up to the 2.35 anamorphic format the rest of the film was shot in. The crowd shot, where the camera was mounted on a Steadicam, was also achieved without opticals. "The fewer opticals, the more money you save," says Alonzo, "so, it was ideal. There is really a favorable economic factor in being able to shoot with the kind of sophisticated equipment we had on this production."

Alonzo also gives high marks to his Canadian crew. "They were extraordinary, wonderful. Their attitude was good and they're hard workers, very open to suggestion and to learning new things. I was very happy with that aspect of the production."

Alonzo, always on the look-out for new technology that enchances his efforts, hopes the near future brings lighter weight lenses and film stock with greater latitude. "And," he adds, "whatever Panavision invents tomorrow, I want yesterday." ■



Selleck hangs from an elevator car in the studio, backed up by a process plate of the city.

Andrew Robinson

Music for *Jewel in the Crown*

The music that forms the rationale for this article belongs to *Jewel in the Crown,* a 15-hour weekly television serial about the twilight of the British Empire in India. It was made by Granada Television, the company in Britain's Independent Television network that made *Brideshead Revisited.*

The story and its film treatment, which concentrates on talk, not action, is a complex one set in a foreign country, allowing very few concessions to romantic, exotic audience desires, and cast with few well-known actors. Most of the large cast of characters are, in fact, rather ordinary British people with a sprinkling of Indians, played by Indian actors, and nearly everyone is unhappy most of the time.

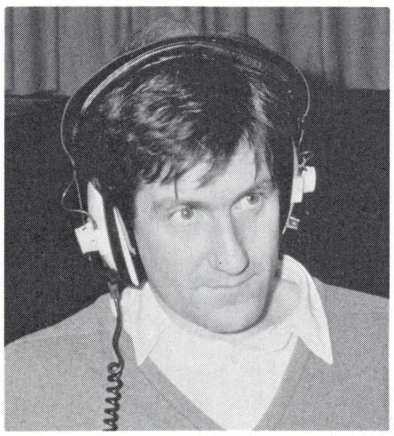
Granada tested the water before committing themselves to what was to be a project involving at least 5.5 million pounds and a 15-month shooting schedule. This includes four months in four far-apart Indian locations – unheard of in television – with a highly successful one and half hour adaptation of a short, prize-winning novel about india, *Staying On,* also by Paul Scott, the author of the four novels known as the Raj Quartet on which *Jewel in the Crown* is based.

The Raj Quartet, published over the period of 1966–1975, is a work of some 2,000 pages in paperback and of substantial literary merit. It is necessary to introduce some of its themes and to outline the main features of the story used in the serial, to comprehend the scale and subtlety of the music composed for it.

Sir Denis Forman, formerly director of the British Film Institute and now the chairman of Granada and the guiding spirit of *Jewel,* is willing to compare Scott's novels to those of Tolstoy. "The novel has tended to shrink, except in popular fiction, so it was good to find one on a majestic scale. The interaction of the British Raj and Indian culture provided the same basic theme as the Napoleonic Wars and the idea of courage and cowardice in *War and Peace."*

To capture the essence of the end of an era, Scott adopts a style of story-telling of monumental complexity, developing a web of themes that the scriptwriter had to try to preserve yet make filmic, while compressing a story that could easily have spread over twenty episodes. This thematic structure was later to pose a comparable challenge to the composer, so it is important to gain an awareness of the story and its themes.

When the Raj Quartet was finally completed, a reviewer was tempted to compare this lovingly constructed edifice of British India to the experience of a long train journey in India, with Scott frequently halting the train to discourse on everything from the Club to Gandhi. To read the entire Quartet is more like doing an extremely complicated jigsaw puzzle. Events do march towards their historical conclusion, but one absorbs them through a multiplicity of viewpoints (including that



Above: *Peggy Ashcroft as Barbie Batchelor in* The Jewel in the Crown. Left: *Composer George Fenton.*

Top: ***A scene at the train station prior to the massacre in Episode 14.*** **Center:** ***Susan Woolridge as Daphne Manners and Art Malik as Hari Kumar in a scene after the rape.*** **Bottom:** ***Geraldine James as Sarah Layton and Charles Dance as Guy Perron.***

of an impersonal "researcher" figure who is obviously Scott himself) which flash back and forth in time, across a period from 1942 to the early '60s. Scott brilliantly adds perspective after perspective on the same events seen through different attitudes, in a search for truth that gives the Quartet its many tones of voice.

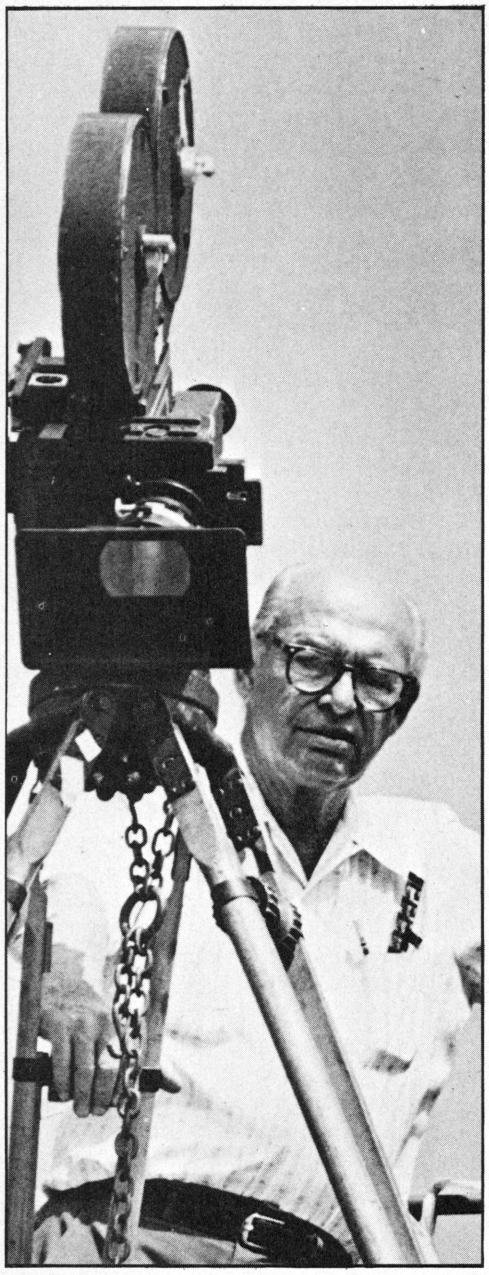
It is a love affair between a British woman and an Indian man that forms the focus of Scott's story and, of course, that of the serial. The well-connected but unconventional Daphne Manners, newly arrived in mid-1942 from wartime Britain in the small North Indian town of Mayapore, conceives an affection for Hari Kumar, an Indian, but one more British than some of the British themselves. He has been educated entirely in British private schools and hates his own Indian roots. It is a love impossible to fulfill and sustain under the pressures of the larger colonial relationship. On a night of rioting in the town, coincident with Gandhi's call for the British to "quit India", Daphne is raped by an unknown group of Indians. The Raj Quartet is about the total circumstances that led to this event, and its reverberations in the lives of all those involved and many who were not. Daphne's British compatriots, living in an enclosed, expatriate community, suspected her attitudes from the beginning to varying degrees; each percieved that a relationship of equality with an Indian must undermine their concept of the Raj.

The character who feels this antipathy for the relationship most strongly is the police officer Ronald Merrick, who has a chip on his shoulder about his origins. He is the nearest thing *Jewel* has to a villian, and the only character to be a living presence throughout the serial. Merrick feels a kind of affection for Daphne, which she does not reciprocate, and a loathing and fear of Kumar, whose dark face combined with an effortless acquaintance with socially acceptable British values, strikes at the root of his self-image. Only Merrick, as the story progresses, sees the nature of the Raj clearly and says so publicly; that the official British-Indian relationship is one of contempt based on fear, however much the British talk of a true camaraderie and cherish the notion in the regimental tradition. Merrick believes this to be "an impossible dream", because he also believes equality between men to be impossible.

Hari and Daphne make love secretly one night, but they are observed and she is raped by passing hooligans. An infuriated Merrick, convinced by circumstantial evidence and his racial attitude that Kumar and friends are responsible, arrests Kumar and beats him badly. Merrick is unable to obtain a confession as Kumar remains grimly silent, and Daphne denies she was with Kumar that night and will not substantiate the police evidence. Kumar is imprisoned for political offenses instead and remains in prison, a shadowy presence in the story until such time as British consciences are provoked to examine the evidence again and have him released. Merrick deludes himself up to his own violent end, hacked to death in retribution by Indian terrorists. Kumar must have been guilty, in his view, because the logic of his Raj demanded it.

The story, of course, moves through 14 televised episodes, involving a myriad of characters and events, leading eventually to Indian Independence in August, 1947. The details must be left to the viewer, but the themes of love, tragedy and epic happenings are the concern of the score for this series.

The composer, George Fenton, a reflective, articulate man in his mid-thirties worked alongside Ravi Shankar on the music for *Gandhi* and before that on theater and some television music. He was picked by Christopher Morahan, the producer, whose previous experience lies as much in the theater as in television, where he has been directing since the mid-fifties. His co-director, Jim O'Brien, worked mainly for radical theater with a little television-play directing experience before starting on *Jewel*. They directed alternate episodes and were of course responsible for the music for their own episodes. They viewed each other's work and swapped criticisms, a working process the more intriguing since they are very different personalities and ages.



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Morahan remembers the tunes in *Jewel* during his wartime upbringing. As O'Brien comments: "Some people considered us quite a remarkable combination – but not a love-match. We always operated on the basis of concern only for what we are doing. It was a relationship in which neither of us held back. We learned in the casting period, when we argued violently, and we took the extraordinary option of working on alternate episodes."

The other musical contributor was Denis Forman. Apart from being in ultimate financial control, he is well-versed in classical music and has written a book on the concerto form in Mozart. Partly because of his strongly-held opinions, he generally stayed away from the composing process and acted as a listener and critic for Fenton and the two directors.

Neither Morahan nor O'Brien are musically trained and neither regards himself as especially musical, but lack of technical language is no real disadvantage to a director, according to Morahan: "I've never once worried. If one can talk in graphic terms – this is what the music should do, how long it should last, throw out some ideas by humming or banging or listening to an example – it's fine. In fact I believe it's of value to a composer to talk in non-musical terms. Anyway, my wife believes I'm tone-deaf." As for Indian music, his knowledge was almost nil, while O'Brien had heard a small amount of classical music and some Bombay film songs. He illustrated his own ignorance with a nicely-pointed Indian story about his first contact with the extraordinary *shehnai,* an instrument whose weird sound is something like a powerful cross between oboe and bagpipes. "I saw and heard my first *shehnai* at a wedding and it was wonderful. A little while later I heard a *shehnai* again and thought marvelous – another wedding. I rushed out – and it was a funeral."

Despite Fenton's already extensive body of film music composition, and also some "pure" composition such as an opera, he is virtually self-taught; guitar lessons at school were his only formal training. "Although it made me so desperately nervous about what was expected from me by musicians," he says, "it made me receptive and keen to extract their contribution." Echoing Morahan's belief in the positive value of lack of formal knowledge, Fenton adds that "if you don't train, receptiveness is your only hope of survival. One of the best things for me is that I have never been totally labeled. That's meant that I've been able to continue being a student. I've had three years as a student of Indian music and it's been wonderful. I never had to pretend I knew a lot about it. People then want to help you. The reason why Indian music is so difficult to use in film terms is the same reason rock and roll is difficult to use. As soon as it starts you feel safe; it's like a blanket." If this seems surprising in relation to, say, an electric guitar vituoso like Jimi Hendrix, Fenton can explain:

"Hendrix's music is violent, emotional, highly-colored but it is not unpredictable in its drive. It's not suddenly going to turn round and take you somewhere else you hadn't expected to go. If one was to take away his guitar music from all the drums, it could be very surprising. That is just like Sultan Khan playing the *sarangi* – you can get the same energy and screaming effect from the electric guitar."

Referring to great Indian musicians – but it could apply to certain rock and blues players such as B. B. King, Eric Clapton or Louis Armstrong – Fenton says that "they aspire to be great when they play by seeking approval from the audience of the way in which they do evoke that emotion that everyone knows is what they are aiming at." He thinks that B. B. King, one of his own favorites, who told an interviewer that he hoped people would hear him and have a good time because his music was happy music, could be interesting if applied to film. "If you were to isolate B. B. King's guitar-playing from his backing, the sound of that guitar could be rather dramatic and sparse with pictures. As soon as you have put a rhythm section with it, you know where you are and it's very hard to move it through different scenes without it having a bland effect."

Much the same is true, Fenton feels, of Indian classical music. "As soon as the *tanpura* or *tabla* start up, it's like sinking into a warm bath. However frantic it gets there's still a sense of it having a good time and therefore it's bland in film terms. And because that's how Indian musicians see their music being performed, I don't think they have that great sense of the potential drama in some of the sounds of their instruments in the way I see them. Or in the way that a western audience would see them."

It is Fenton's special achievement that he has successfully used both the instruments and some of the forms of Indian music in a score that remains palatable to untutored western ears. The various attempts at fusion in 'pure' composition since the 1950s have been somewhat disappointing. The collaboration of Ravi Shankar and Yehudi Menuhin has been the most notable, but, Fenton feels, "in his first concerto Ravi Shankar hasn't given himself room to express the raga. The right framework will allow Indian instruments to speak with their own voice." The music for *Gandhi,* in which Shankar did the Indian scenes and Fenton the South African ones, with some overlap, also suffered from a lack of cohesion between Western and Indian elements. 'I think Ravi Shankar did find it quite hard to recognize that the music had to be something other than a vehicle for a tribute to Gandhi. It had actually to engage an audience who never heard of Gandhi. To do that you have to do certain things that are quite vulgar to a purist. There was a sense in Ravi Shankar that he would have liked a moment in the film to let his instruments speak in his own way. He did actually have one and he was tremendously powerful. But there was a great danger that the whole film could have become a series of personal statements."

Not surprisingly, there was some concern and caution early on about the amount of Indian music suitable for a popular television serial. According to O'Brien, "an argument was offered that English instruments and music were the only thing we understood. We didn't understand Indian scales and certainly didn't understand Indian classical music at all."

"This was reinforced by the general consensus at Granada", to quote Fenton, "that the music should be Elgarian: music of the English and about the English. I think people imagined that you would want to reinforce the English-

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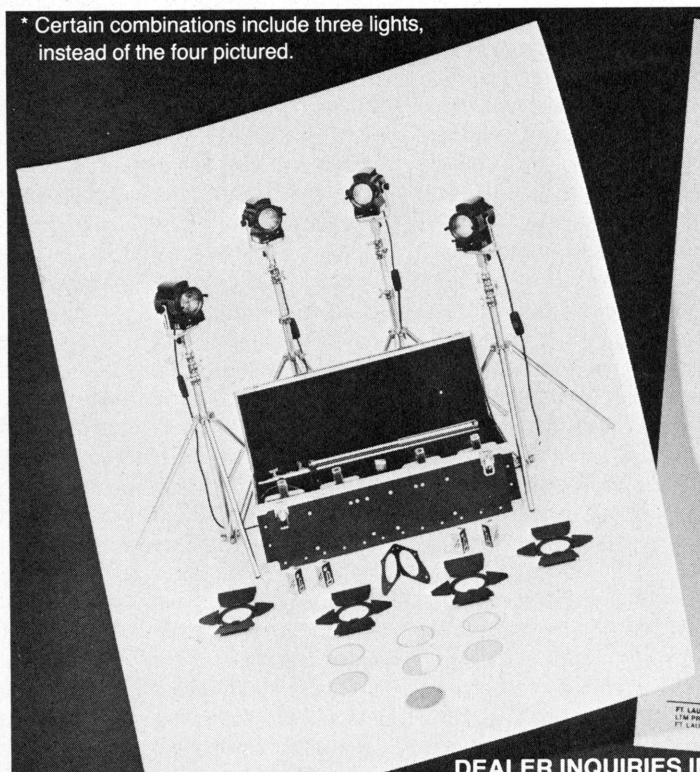

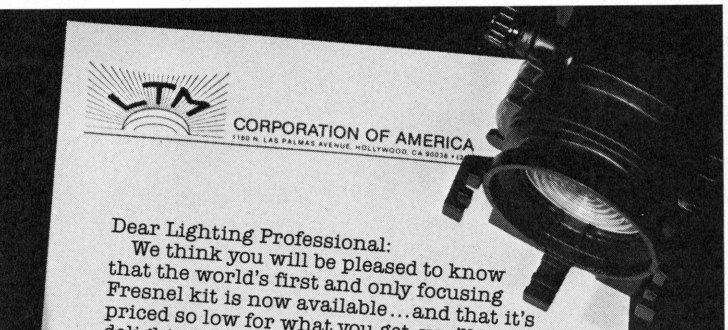

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ness of the characters with the music since *Jewel* was being shot in India. The problems in fact is that a garden of a house in Kashmir looks like a house in Surrey. And you can't smell Indian on film either. So it is not as simple as people thought."

It was also necessary to remember, as O'Brien points out, that the majority of the British audience understands *no* classical music, Western or Indian. "What seemed important," he says, and here he articulates the essential attitude behind the Indian elements in *Jewel*'s music, "was that there were all kinds of associations people might have that would be capable of bringing out flavors, atmospheres, emotions by using Indian sounds. But we had to try to find a way of making them more than Indian restaurant music. To do this one was obliged to break rules, to use instruments which are not proper to the task or to use melodies not proper to the task."

Fenton would have liked to be a little bolder at times with the score, including the use of more alien sounds, with the Indian elements more clearly articulated, but he accepts that there are limitations, which are much less than they were pre-*Gandhi* and pre-*Heat and Dust.* At one point he wanted to write a cue based on the Indian national anthem, but abandoned it when the directors established that it would not have any useful associations for most people watching. Nevertheless, O'Brien points out with amusement, it is "George's little joke", that many of the regimental tunes – of all things – are based on ragas!

George Fenton gets real pleasure from the limitations imposed by marrying music to film, and the problems thrown up by the entire process of composition. "One of the reasons I'm a film animal is that I actually like the restrictions of time on my music, I enjoy making it work." On the other hand, it is tremendously hard work physically, even more so in *Jewel* than in other shorter productions, partly because of the amount of music required, but also because of the unfinished quality of the film material available at the time, and the shortage of time between then and transmission of the first episode; consequently much editing, recording and dubbing took place while the serial was transmitting. "If you are scoring as well as composing, there's hours and hours of work on minute details. Somehow you develop a kind of production line mentality. You have this sensitive time when you talk coherently and make all the right decisions, then it becomes nuts and bolts. You can get very bored."

Reverence for an existing work or subject is probably damaging for a composer, Fenton feels. "I had a bad attack of it with *Gandhi.* What piece of music, what first bar, could possibly measure up to the subject?" Writing music for films requires "a certain vulgarity" and "the most important thing is that you feel the greatest sense of release when you come to work on the film."

For Fenton, such conditions can only exist when he and the person who has made the film can "connect" – such is the rather awesome responsibility of the composer, whose work has the power to destroy everything that has gone before. "The best way you can make a contribution is to really try and understand what that person who has masterminded the entire operation wants from the final piece of the jigsaw." This is the capacity that Morahan saw in Fenton from the first: "The composer's responsibility is to the material, to making it a more total experience. George has an understanding that the whole is greater than the various parts and that the director is the person to put all those parts together." When the director has such a controlling vision, Fenton believes, "everyone who makes a contribution to a film stops themselves developing an overall vision of it. It's dangerous area because you start saying to yourself that your problem wouldn't need solving if they just made a cut there. Making a film is a bit like a session in jazz where a lot of brilliant players want to play all the time."

Serious discussions between the directors and Fenton began only after he had seen a rough assembly of the entire 14 episodes, roughly six months before transmission. According to Morahan, "some of these were rougher than others but some were quite well-wrought even then. There was a show of sorts." He adds: "I would have thought it's better to see a rough assembly rather than rushes or a finished print, to get the juices running." On *Gandhi,* Fenton had the luxury of a fine-cut print, and Fenton clearly found it tough to compose for *Jewel* without a complete picture of the serial in his mind. "One of the things I found hardest in *Jewel* was to hold in my mind 14 hours of material. There are some very big gaps that you have to hold in your mind. It's not much use spinning on from cue to cue. It's rather like an actor reading a play, whizzing through underlining the bits he's got and only reading those. How do you bridge those gaps, or don't you bridge them? And how do you get in again? What voice do you use when you want to come back? That's very hard to tell from a rough assembly. To a large extent I had to rely on the two directors. Overall they had a sense of the thing in balance in their minds which I didn't have."

The keynote of the entire composition process was really pragmatism guided and tempered by instinct. There was no grand plan, although both directors would have preferred a more structured approach, according to O'Brien: "In the beginning we were all scheme and no music. We thought it through and agreed on an overall scheme. I would then have a meeting with George and then go back to Christopher and tell him what I was working on with George." Themes were an early topic of dicussion and discovery: "there were certain ideas and relationships that generated melodies that could be reinterpreted at different stages," Morahan says. The trouble was, O'Brien remarks, that the schemes foundered on the lack of tangible music. "Our ideas of where music might go and what it might represent were overly schematic. This is where Hari meets Daphne and this is where a couple of characters meet and this looks back to the previous episode, no sorry three episodes ago, but it's the same piece of music. We would then discuss whether is was viable to carry through a musical idea after three hours (and of course three weeks during transmission), then argue about whether we shouldn't use a totally different piece of music if no one was going to remember that piece. There were certain obvious musical ideas we began to get a hold of to do

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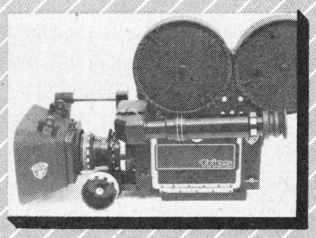

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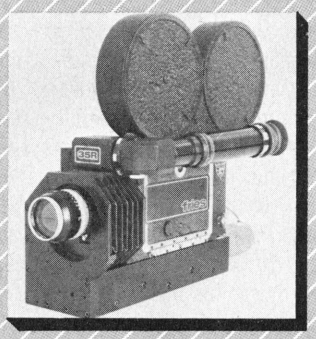

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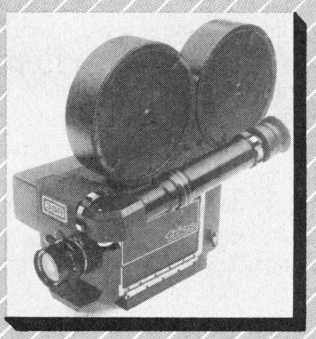

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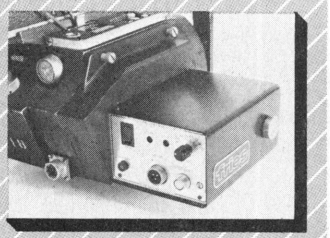

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with the triangle of Merrick-Hari-Daphne and the Daphne-Hari love theme. We attempted to apply them to other places and found they would not work."

The original love theme, which is the most satisfying fusion of Western instruments and sensibility with an Indian musical form in *Jewel,* emerged from a typical demonstration by Fenton with the directors listening and commenting. Morahan describes the method: "George would experiment with a piano, with a gramophone, or with music he had composed in the past. So gradually, by the application of musical example to film, we evolved a pattern for the first two or three hours. It's painstaking but it meant that the music was conceived organically, out of the conversations we had."

This method of trial and error was also applied to find the right ragas to suit the themes. "One of the difficulties," says O'Brien, "was that we'd take something Indian and orchestrate it in a Western pattern and we'd hear something that would sound like cheap Ali Baba music, because it was a particular raga that wouldn't adapt. We took another raga and it would sound as Western or as Indian as you wanted it to, depending on how it was played, and without an intermediate phase at which it became embarrassing."

This process was greatly helped by Fenton's ability to play pastiche music. He composed all the military band music in the serial.

Certainly in many ways the schedule of the production militated against ideal composing conditions. Fenton composed sequentially from Episode 1 through to 14, despite the possible thematic demands of later episodes in relation to earlier ones. The directors would see him at home for two or three days and discuss three or four episodes at a time. Then at a session up to four episodes would be recorded depending on the availability of instruments.

Fenton recalls that the practicalities of editing the film were unique in his experience, in that the production could have no focus of activity. "They were cutting episodes while I was scoring and dubbing episodes while they were cutting, like a production line. The only points of reference were the two directors. The editor came to only one scoring session because he had no time. I didn't go to any of the dubbing which was extraordinary; it was left entirely to the directors. They did introduce a measure of flexibility; they did frequently cope with reasons why I couldn't get ahead, or problems when the right musicians weren't available. But the disadvantage was that I didn't have a fine-cut to look at. I couldn't chart the schematic side of the score, how the themes would be used."

O'Brien was particularly concerned about the need to commit oneself to the music for the first two episodes without having any real shape for the rest of the episodes at all. When the first recording took place, the opening theme was not yet written. They had not had time to think it out. Though they were able to return to the first two episodes and lay the theme in, they missed certain opportunities to produce variations on it early on. O'Brien is uncertain though if hopping around from cue to cue through the serial would have been superior as a method. "They say when writing stories the best way is to know your ending. I don't know if Scott knew his, when he sat down to write Book 1 – how it would all end. He worked his way towards a natural finishing point in the story-telling. In a sense you have got to make a beginning."

The time when his ideas have to confront reality, in the form of a deadline, when the music really starts to take shape, is a time of excitement for Fenton. "Deadlines give tremendous energy. The thing that most people who do creative things desperately long for is a structure to their life. They long to be told that they have to do it by breakfast tomorrow. And I think a production line mentality in some ways works for you. It defuses something that becomes so immense in your mind that it prohibits you from working – the seriousness of the work. It's through doing it – the combination of all that background and the pressure of the moment – that things crystallize. That's inspiration. It either kills you or it produces an idea. Inspiration produces the energy to hold in your mind every cue in the film. You can have it all filed in your mind and turn to any cue at any time. Then you know what to do at each point."

There were one or two scenes where it became apparent that they should be recut to accommodate a musical idea. In general Fenton does not favor recutting but prefers to welcome the discipline imposed by the director's cut. "There are occasions, though, when it is very good if the director does recut if, say, there's a big tune that you want to use."

The actual recording of all the music for *Jewel* took place in Britain, like that of *Gandhi,* and with both directors always present. There were four main reasons for recording in Britain rather than in India, which Fenton feels he would have preferred for musical reasons: lower cost, better facilities, the availability of session musicians experienced in playing Indian instruments, and lack of time. As Morahan says: "I investigated recording in India but decided to sacrifice some things in quality of playing for greater control."

In the event almost all musicians were non-Indians. "Indian players," Fenton says, "must be able to cope with the burden of recoding music for TV, that is must be recorded to film. The session environment and the disciplines of playing Indian music are not very similar. The session can be over and they'd still be tuning up if they had their way really. If you want the session to start at six you have to tell them to come at four." The reading of music is another awkward problem. "Indian players can't usually read music. On *Gandhi* we had a group of orchestral musicians who read it all off first go. In Englih session orchestras you've got the finest sight-readers in the world."

The limitiations to some extent affected the choice of instruments. Unlike *Gandhi,* which used the violin-like *sarangi* and the *shehnai* liberally to powerful effect, in the hands of two players amongst the four or five finest in the world, in *Jewel* these instruments are sparingly used, especially the *shehnai.* This was a direct result of the lack of session experience of the available players.

The lack of convention governing the nature and function of *Jewel*'s music is refreshingly evident so far in the discussion. As Fenton says: "The best way to avoid cliche is studiosly to remain ignorant about what the cliches are." Yet it is worthwhile to question if Fenton and the directors

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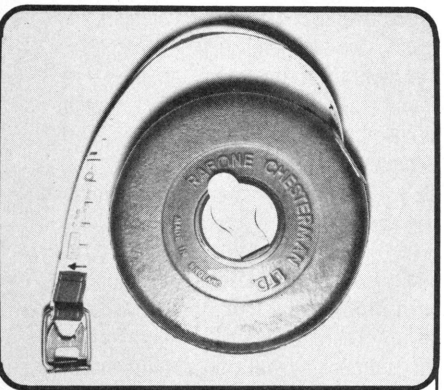

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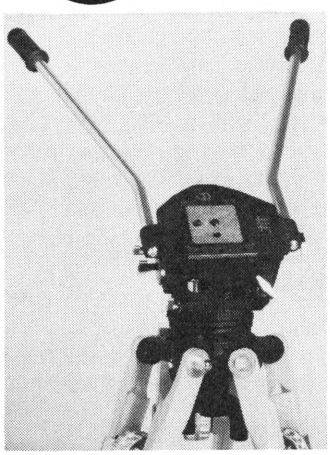

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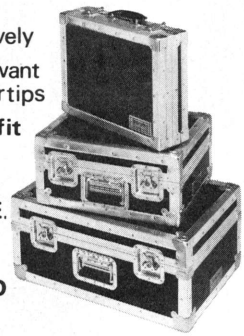

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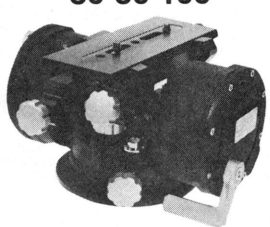

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have theoretical attitudes to their work.

Satyajit Ray has felt "a kind of conflict" about the use of film music from the beginning: "I have always felt that music is really an extraneous element in films, that one should be able to do without it, express oneself without it. Why do we use it? Because we are not confident? Because we underestimate the audience? Because we feel that a certain mood must be underlined in case the audience misses it?"

While greatly admiring Ray and his music, Fenton cannot quite agree with this austere assessment, despite having "a high cringe factor" himself. He admits to the pleasure of being "totalled" by the best American movies, yet he says of *Jewel* that "one was spoilt because so seldom did any of the scenes actually need to be scored. There is some acting in *Jewel* that is just so wonderful you could never tire of it."

In Fenton's view, in general one composes music for an audience "because you want them to feel free to identify with the feelings of the people in the film if they choose. If you have a film as dry as a bone, it's rather like watching a documentary. There are so many touching things in everyday life one observes but does not want to feel sentimental about. In a film one needs to let the audience know it's okay to give in. The music has a tremendous responsibility to tell the truth. It's no use manipulating an audience one way for their expectations only to be dashed. We have to look for ways of unlocking emotion while remaining truthful to the film. It's hard to judge."

There are several powerfully emotional moments in *Jewel* that have been left unscored, but many that are scored. Morahan says about their attitude to these: "Both George and I agreed that music should not be the substitute for emotion. It can prepare the ground. Sometimes the burning truth of what an actor is saying and expressing must be allowed to stand on its own."

Economy of music in Fenton's work especially strikes O'Brien. "Music allows emotions to flow. Something about George's particular approach that makes it work is that he gives very little pre-information. He does not signal events or tell you how to respond with orchestration."

One of the ironies flowing from the attitudes of the creators of *Jewel*'s music, is that the record of the serial, expected to be a best-seller like that of *Brideshead,* sold quite poorly. O'Brien comments: It's a very odd thing to say but it's true that the sales reflect the success of the music as film music. It would have been extremely easy to produce best-selling music that wouldn't have been of much worth at all."

This is what he feels about the music for *Far Pavilions,* by Carl Davis, and, to a lesser extent *Brideshead,* views that Morahan essentially shares. "It might have been much more fun to produce some satirical music for *Far Pavilions,*" says O'Brien. "It was a bodice-ripper and the music was part of that package. In *Brideshead* they overfilled the film with music. It had a life of its own. It was doing some things not supported by the pictures, and was used rather like a six-inch paintbrush. But I think a lot of people enjoyed it." To which Morahan adds, pursuing the house-decorating analogy: "It was pasted on."

Both directors are awaiting with the greatest interest American reaction to *Jewel*. Morahan says: "I shall be fascinated. I have no idea whether Americans will find it slow and tedious and unpointed or whether they will find it interesting." His co-director goes further: "*Jewel* could be responded to in the way a mainstream audience responds to, say, a Yugoslav film. It might be seen as totally foreign in its terms of reference. I hope, however, that people's natural curiousity about character will win out."

Neither of the directors has much respect for the way film music is used in American films today. Morahan says: "There is a fear of some American producers that music should not cease in case someone's attention wanders, and people start to feel they aren't getting their money's worth. If *Jewel* had been made in the United States there would have been, say, five times more music." O'Brien agrees and puts his finger on how it would have been used. "American attitudes to what narrative is are different. Narrative tends to be action and about character in a secondary kind of way. *Jewel* is a very good example of character in the ab-

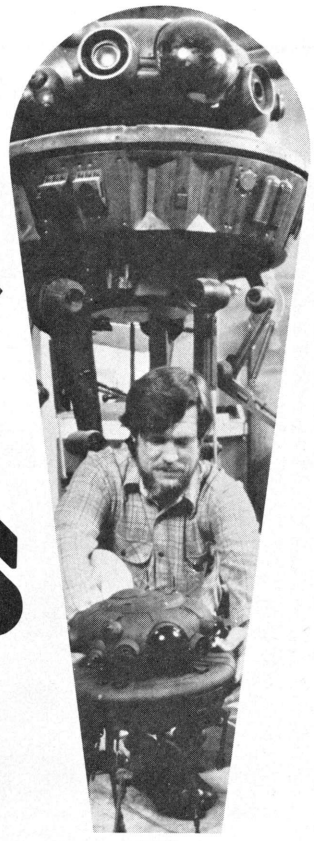
sence of a great deal of action. The Americans would have wanted music to produce a sense of narrative action where there wasn't any, to produce climaxes that we didn't feel we needed in the score, and to structure the temperature of the serial."

Fenton, who has a keen admiration for the technical polish of American movies, agrees with the directors that the emphasis on the spoken word is greater in Britain and Europe than in America, and that the excess of music in film reflects this. "If you look at an American film where the spoken word is more important – a Neil Simon or Woodly Allen film for instance – generally their use of music is in line with what we expect. But in mainstream cinema and TV it's nonstop. I think it's to do with the idea that to give an audience a good show you hit them with everything."

O'Brien has a more down-to-earth explanation for much of the musical assault on audiences. "It's not insignificant that in American movies and TV it's not the director but the producer who deals with the composer. I would no more let someone do music for my film *in absentia* than I would let them cut it."

The two directors are in general agreement as to the correct amount of music needed, but inevitably differences in emphasis arise. O'Brien says of Morahan that "I'd probably be more reticent than he about the amount of music to use in a scene." The pivotal scene of love-making and the rape of Daphne in Episode 2, which was one of Morahan's, caused discussion and compromise. A battered Daphne and Hari are seen, at night in flashback, collecting themselves together after the gang of Indians has departed, and there is an impassioned plea from Daphne that they stop meeting and that Hari must deny that he had seen her that night. He is forced to promise.

This was a long flashback and it had been heavily scored. "The first time I heard the score," says O'Brien, "it seemed extremely rich. We felt that the whole episode had so much drive it was difficult not to write smilarly driving music. But I felt it was in danger of being slightly operatic; you felt you were listening to a scored drama." Morahan partly agreed. "Jim



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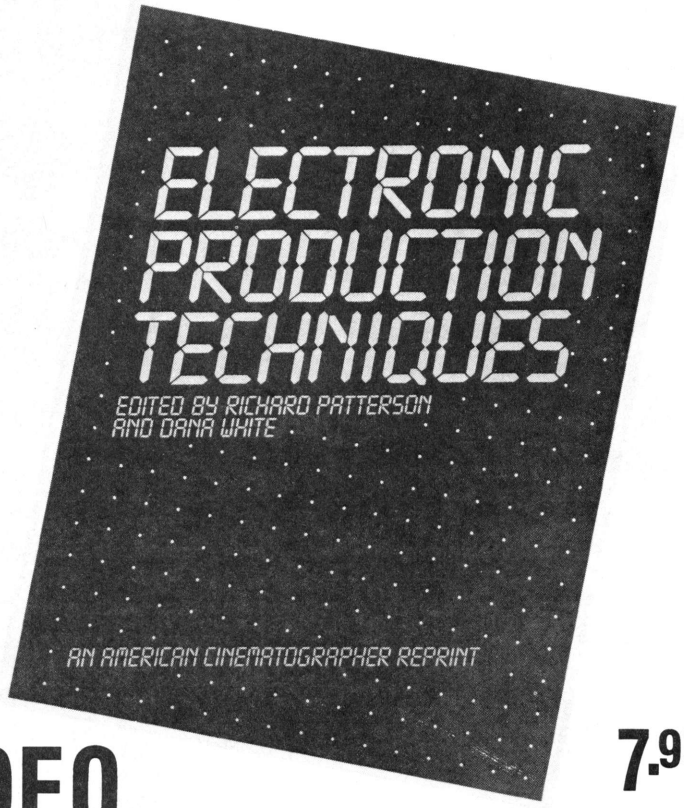

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was suspicious of my using music in that scene at all because it was so extraordinarily performed. I was flattered by what he said but I wanted to make the experience even more total. I think George wrote an extraordinary score but I took it out sooner, because I felt, listening to Jim, that the final exchange between Hari and Daphne 'I promise, I promise,' would be better without music. This was a natural evolution of music out of criticism."

Compared to the cinema, Morahan generally favors less music on TV, but perhaps paradoxically believes it always to be one of the ways in which it is proper to engage the attention of an easily-distracted audience. "It's the nature of the circumstances of watching TV and cinema that dictates the differences. In the cinema there's a collective experience that's stimulated by action and story. Whereas in TV there's a bias toward the story being internal and it being developed by what people say to each other."

It might also be thought that, in addition to scenes of high emotional intensity, music is a natural companion to scenes of dramatic action. While the war scenes in the jungle in Burma in which Teddie Bingham dies and Merrick is badly scarred are conventionally and effectively scored with fast-paced harsh music, no music is used with an equally dramatic incident with Merrick in Episode 14, in which he falls from a horse. Nothing that is, until *after* he has fallen. This was deliberate reticence by O'Brien:

"The traditional scoring is that Merrick strides off, the score strikes up and builds up to the moment when he falls. What we did was to wait until the moment he fell and then release the music. We felt there was enough going on in the moments leading up to the fall. We didn't want to precue it or to dramatize that particular moment unduly. When he falls is a moment of natural drama and the meaning of his fall could somehow be expressed by music related to the triangle."

Like Morahan, O'Brien is very cautious about using music to represent characters, believing that it oversimplifies used in that way. "To a certain extent," he allows, "if you introduce a character without a proper introduction and you want that charac-

ter to represent something in a way that you can't necessarily tell in the story, then you might use music to clue that character. But if the story is working properly you shouldn't need to clue the characters with music."

One pattern that is evident in the serial is that the amount of music increases as the serial progresses. There are at least two legitimate reasons for this. First, there is the expectation that, since the end is getting nearer, situations will be resolved in various ways, and second, that there are more echoes on which to draw musically since the whole cast of characters and relationships are known to the audience by that stage.

There is agreement between Fenton and the directors on another subject that can sometimes be contentious: the use of the authentic music of a period. *Jewel* of course uses certain songs of the thirties and forties to subtle effect, including Glenn Miller's "In the Mood." Hari and Daphne dance alone to it when they start meeting, in 1942. Three years later in a party in Bombay, it is playing again as Sarah begins to establish her friendship with Ahmed. As Morahan says, quoting Noel Coward: "Cheap music is so potent." Apart from this, authentic music such as that of Elgar is not used. " 'Pomp and Circumstance' itself would have been a cliche," for introducing the Raj in its heyday, says Morahan.

The problems associated with the use of authentic music are at least two-fold, according to Fenton. It will probaly have not the language to cope dramatically with the scoring of the entire film, and also it will have popular associations that are best avoided. It gives him "a tremendous mischieveous thrill" that people have asked him what the piece of music at the front of *Jewel* is, but he prefers to leave period music proper alone, especially as *Jewel* is made for the 1980's and not the period when Elgar was composing.

From the earliest discussion, it was clear that thematic music would be needed for *Jewel;* it arose naturally from the style of story-telling, but it was not at all simple to decide on how best to tackle the idea in practice and to develop a scheme. One difficulty was the question of how much faith to put in

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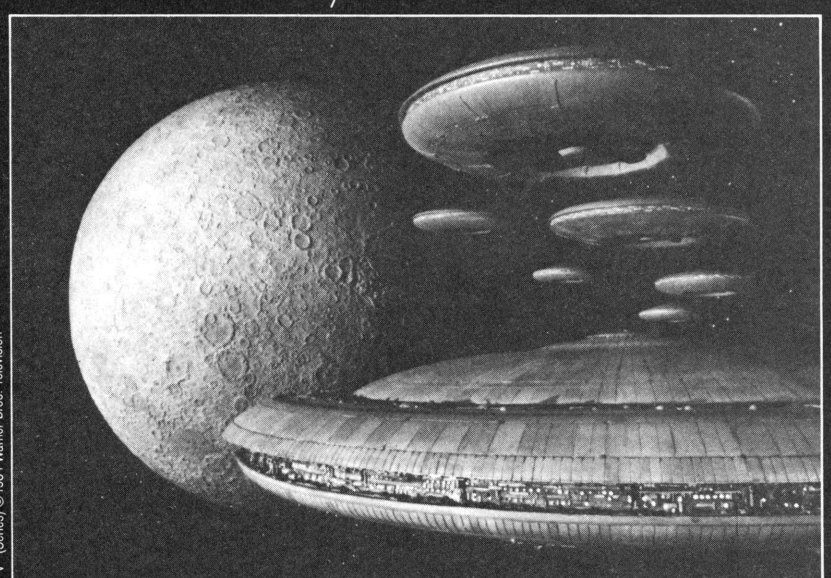

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the ability of the audience to make connections between cues, particularly in episodes split by a week or more in transmission. This is a notable problem in *Jewel* because the thematic cues are often far apart, and this would normally suggest the need for more recognizable melodies than other serials might use.

There is no way of measuring this audience empathy. As O'Brien points out: "It's something you do on trust. Some people with a good ear will hear connections: others won't. I know enough about music to know the huge gap; it's like dealing with some people who are blind and some who aren't. You have no idea whether an audience is audio-blind or not." Fenton's underlying attitude is even more optimistic: "The whole idea of the score was to be thematic and to try not to under-rate the audience's potential for making connections, which the music would perhaps help them to do, if it could continue to tell the truth." He adds: "I don't think people consciously remember a theme from three episodes back but it was strange how people would respond to the music in later episodes with a much more positive feeling. They felt it more because they had already heard it. They sensed a kind of tying up of loose ends."

The original themes grew organically from conversations, in many cases about the first two episodes. The Triangle theme that binds together Merrick, Hari and Daphne was an example of this, as was the music late for Sarah and Ahmed. Morahan recalls the way the Triangle theme developed from the very early scene in which Hari is arrested by Merrick as a possible troublemaker, before we have even been introduced to Daphne; a fateful meeting that sparks off all Merrick's resentment. "The tension that Hari created within the European community, and Merrick's involvement in it, seemed a theme that would be used again and again. I had an idea about a particular low hum at the beginning of one of Mahler's symphonies. I said try it on gramophone record at the moment Hari is arrested and play it as the truck carrying him is driven away. Then George, seeing the scene of Hari and Daphne at the War Week show, observed by Merrick from a distance, thought there should be a reprise of that theme."

Once established a theme would usually dictate, sometimes in wonderfully subtle ways, the use of variations later in the serial. The haunting love theme of Hari and Daphne is the most interesting and frequently used example of this; O'Brien christened it Supercue. The directors hit upon its nature and function early on, as Morahan says: "It would be celebratory when they were discovering their love for each other, more poignantly used when they were separated or when she died, and then come to be associated with the memory of Daphne, her baby, Hari in prison and then throughout the growing love of Sarah and Guy Perron."

Interestingly Fenton was less hooked on the thematic possibilities, coming to see their use as perhaps more a pragmatic response to the material than a notion to be imposed on the material. "That was an important theme for me because I felt it translated both the mixed feelings of Daphne and of the audience. She is asking – is this moment so special to me because of the person or is it the romance of the country or what is it? I wasn't particularly keen to keep it alive for the sake of the theme. But one of the things that dictates how much you keep a theme alive in a film is where the music's going to go."

Fenton says: "I wanted the first moment of unspoken affection to be an Indian experience for Daphne, but not an alienating one musically. The instrument is a *cor anglais,* not an oboe. Particularly when it is played higher up, it has a quality that is not quite as familiar, as labeled as an oboe. Oboes are so pastoral and have so many associations. The *cor anglais* is playing a raga. Although the strings move, basically they are droning. The *cor anglais* is played by someone who has studied Indian music. I wrote it with very odd time signature, in western terms, so that it sounds as if it is playing rather freely. It's not an *alap*, the slow introductory phase of a raga, but is has an exploratory sense about it, searching for a melody. I hoped that the specific sound, and certain specific phrases in it, would transmit itself as a melody and become a tune for the audience, without them realizing it is a raga."

Not all the themes worked into the structure of the serial as comfortably and feelingly as the love theme. Oddly enough, the crucial opening theme – pastiche Elgar over a wonderful series of scenes from newsreel of the pomp of the Delhi Durbar for King George V in 1911 – was quite late in coming and this of course affected its later use in the serial. Morahan says it was clear what was wanted: "We had already decided it would celebrate Empire. We had evolved a beginning from the newsreel that showed a world which was to change. With George we had decided that the music should be the same every week, that it should herald the serial and that it should have no sense of its own destruction. Without mockery the music would support this fully."

The final theme is a flowing, uncertain but hopeful mixture of East and West. There was considerable debate about its content. Not about its general nature, which was "supposed to represent the reaching forward, with the opening theme as the background shadow to the story," as Fenton says, but about whether each episode should be different. As Morahan says: "Jim felt it should be essentially the same. In the event it inclined towards the latter; there are about five versions of the end music introduced in slightly different ways."

Besides action, mood, relationships and characters, the music in *Jewel* also sometimes conjures up predominantly the sense of a particular place, such as Mirat, Kashmir or the hills around Pankot. "I said that the music should describe an older India and perhaps have the elegance of court music. I didn't know what I mant by that; I had to learn." Morahan says.

It is a tribute to the creators of *Jewel in the Crown* that the music is sometimes able to accomplish so many purposes effortlessly and with beauty. Some of the thinking underlying it has been hinted at rather inadequately in this article. Perhaps the most truly satisfactory response to the music, both for George Fenton and the directors, has been the fact that critics and others who have so much enjoyed watching the serial have hardly been aware that the music was there. ■

Richard Patterson

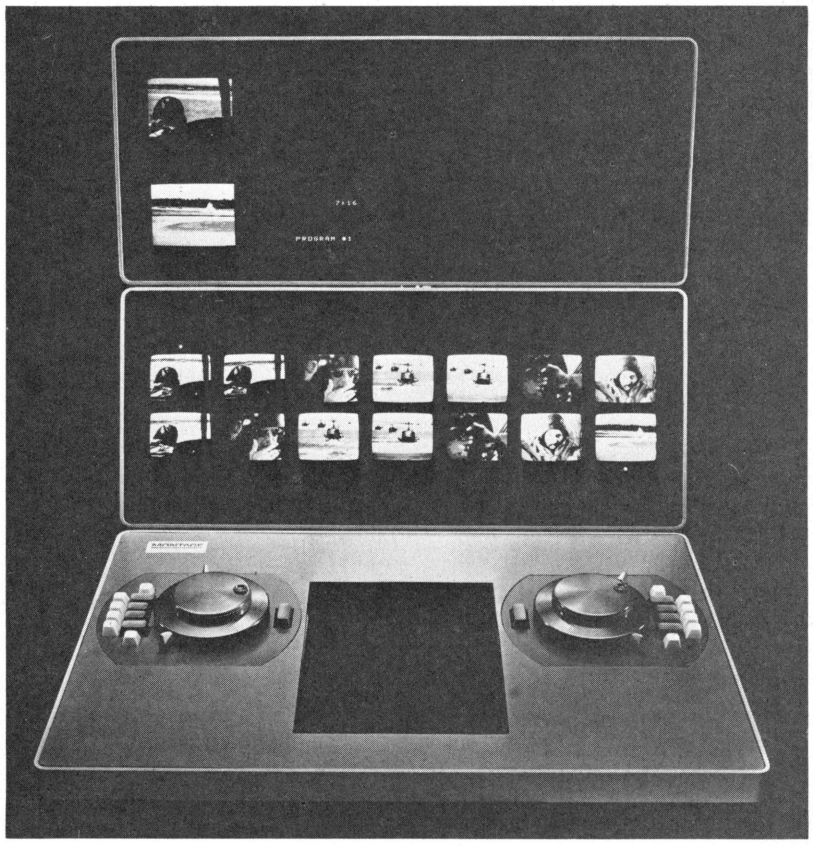
Editing

Film Style Video Editing Systems

Several video editing systems have been introduced this year which are designed to permit "film style" editing of either videotape or transfers of film original. Editing in any medium is a matter of selecting pieces, assembling sequences, adjusting transitions and rearranging pieces of picture and sound, but the techniques used are often dependent on the tools available. Film editing techniques or procedures have evolved with the development of the Moviola, magnetic sound tracks, tape splicers and flatbed editing tables. There is, in fact, no single standard procedure for film editing. The editor's methods may vary according to whether he or she is cutting 16mm or 35mm on a Moviola or a flatbed with or without an assistant editor. They may also vary according to the editor's creative approach and the subject matter of the material being edited.

Videotape editing has its roots in the procedures of live multicamera broadcasting. A great deal of videotape editing technique is still based on concepts derived from the process of switching between cameras during a live broadcast. The development of videotape recording, however, opened the door for the evolution of a different style of editing in videotape. In the early days videotapes were physically cut and spliced in a way similar to film except that the positioning of the splice was much more difficult and critical. Since there are no sprocket holes or visible frame lines, it was necessary to sprinkle iron filings on the tape and examine them under a magnifier to detect the magnetized portions corresponding to the frame lines. Although this form of editing was cumbersome, it did permit greater flexibility in the taping of television programs and as late as 1970 *Laugh In* was being edited in this way. The real breakthrough in video editing

EditDroid



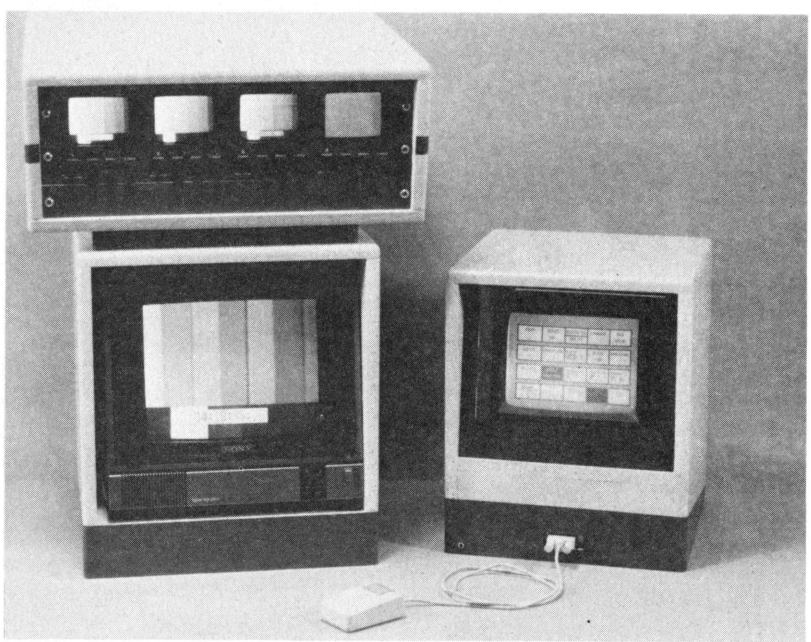
Montage Picture Processor

EnVision

techniques came with the development of time code, which made possible frame accurate editing by re-recording. (For an overview of time code based video editing procedures see Gary H. Anderson's "Understanding Video Edit Systems" in the January 1984 issue of American Cinematographer or in *Electronic Production Techniques.)*

Editing via re-recording, while it has many advantages, is limited by the fact that it is essentially a "linear" process. Once a series of cuts has been recorded as an edited sequence, there is no way to alter the total length of the sequence except by re-recording all of the cuts coming after the change that has been made. This has been a great source of frustration for film editors who begin editing tape. If the editor builds up a ten minute sequence and then decides to alter a cut by even one frame, he cannot just roll down to the cut, pull a frame or two out and then splice it back together. As a result many film editors have felt that video editing was an efficient means for getting a fast first cut but too cumbersome for the kind of re-cutting and polishing which is customary in most film editing.

Eeco EMME Cinemagraphic Creative Workstation



This problem has been addressed in several ways. The most obvious compromise is to re-record the entire sequence from the first edited version using whatever other material is required to make changes as you go through the reel. The time required for re-recording can be used for viewing and evaluating the first cut, and the time required to make changes is minimal. While this approach is viable in many situations, it does have two limitations. First of all it involves a loss of image quality which may not be objectionable in a second or third generation recording, but which can become severe after several recuts since most "off-line" video editing of this sort is done with ¾" or conventional ½" cassettes. One inch master tapes can go through ten generations without an objectionable amount of image degradation, but ¾" and ½" cassettes use a different method for recording the signal and cannot adequately survive several generations of re-recording. To go back to the original material at any stage in the editing process would be the equivalent of ordering a fresh workprint and having to conform it to the edited one.

The second limitation of this approach has to do with the way in which the time code information is affected. If the time code is longitudinal time code recorded continuously on a separate track (See "Time Code Basics" in the March 1983 issue or in *Electronic Production Techniques* for a discussion of longitudinal vs. vertical interval time code.), the time code on the edited tape does not match the time code on the source material. In order to keep track of the original source for the material in each cut, it is necessary either to combine the original time code information with the video signal or to maintain a log of some sort. With computerized editing systems this log can be created automatically and stored in the computer memory. It is called an edit decision list. The time code information can be combined with the video

signal either in the form of a "window dub" in which the numbers are displayed in the picture area as a subtitle or in the form of vertical interval time code. Vertical interval time code can be read electronically, but requires even more sophisticated equipment. Time code displayed in the picture area can only be read by eye and logged manually.

Despite these complications video editing by means of re-recording in this manner can be an efficient and cost-effective means of editing – especially since the editing systems required for this approach are the least expensive editing systems made.

As the complexity and sophistication of a computerized video system increases, the ways in which these limitations can be overcome improve. The first improvement probably comes with the "list management" capabilities of the system. A simple edit decision list is a record of every cut made with the corresponding time code of the source material and the time code of the tape onto which the edited version is being recorded. Once an editor begins to re-cut a sequence, new "edit decisions" are automatically logged into the computer, and "list management" refers to the computer programs which clean up the list by replacing or revising the old edit decisions and keeping track of the original source for each shot. List management essentially means that the computer in the editing system is continually logging the sequence in the way an intelligent assistant editor or negative cutter would log a reel after it has been fine cut and locked. This list management can become very complex, and the speed with which a system will update the edit decision list after a change is made may be a major factor in how efficient the re-cutting and fine cutting process can be. One system may wait until the end of the editing process and then spend a considerable amount of time cleaning up the list before printing it out or otherwise making it available. Another system may constantly update the list as the editing process continues, and its ability to do this quickly will facilitate the process of re-cutting sequences.

Another way in which computer sophistication can overcome the limitations of editing by re-recording is

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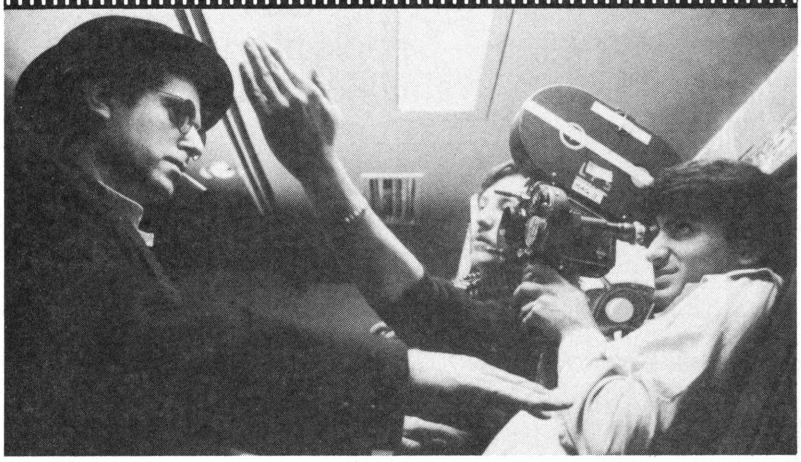

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by permitting the system to automatically re-record an entire sequence in accordance with the updated edit decision list. The ability to automatically find the appropriate piece of source material and record it in the proper place on the new cassette is referred to as "auto assembly." Depending on how the source material is distributed, how many playback cassette decks there are in the system and how sophisticated the programming is in the system's computer, it may conceivably be possible for the re-edited sequence to be completely re-recorded from the original material in about the same amount of time it would take to view the edited sequence. It may also be possible to have the sequence re-recorded while the editor takes a break.

With sophisticated list management and auto-assembly it becomes feasible to edit by re-recording onto a new cassette in a manner resembling the way a film editor would assemble and re-cut a sequence. Any delay involved in the auto-assembly process is probably more than compensated for by the savings in the time spent handling the original material. The Eeco Emme system is an example of this approach to "film style" video editing.

Another approach to overcoming the limitations of video editing via re-recording is to devise a video editing system which permits the editor to view an entire edited sequence without having to re-record any of it. The ideal means for achieving this would be to have all the original material stored in some form which permitted instant random access to any piece of it.The original CMX editing system stored a black-and-white version of the source material in its computer memory so that any frame could be accessed instantaneously, but it could only access 30 minutes worth of material at any time and proved too cumbersome and expensive to be commercially viable. Video discs on which any frame can be accessed in less than three seconds seem to offer the best alternative to storage in computer memory, and some of the editing systems being introduced were conceived with the idea of using laser video discs. While the time and cost involved in transferring film or videotape to video disc have been reduced dramatically during the past year, many

people still do not consider video disc a viable medium for editing; and most of the systems conceived with video discs in mind have been designed to operate with video cassettes as well.

The way in which random access can be achieved with video cassettes is by having multiple copies of the same source material. If the same material exists on several cassettes, the system can be playing back a portion of a take from one cassette while it is cueing up a portion of another take on one of the other cassettes. It then switches from one cassette to the other at the edit point dictated by the edit decision list. When the editor assembles his rough cut, he previews each cut just as he would with any video editing system, but instead of re-recording the two pieces he simply adds information to the edit decision list being maintained by the computer. His ability to "preview" a whole series of cuts is limited only by the number of playback cassette decks on the system, the maximum time required to cue up any given cassette and the shortest duration of any cut he has made. Provided the system has the appropriate programming, it is possible to constantly re-cut the sequence and the system will recalculate the most efficient way to play back the sequence of cuts from the cassettes available to it. This is essentially how the EditDroid and Montage systems work.

With video discs the principle is the same, but the execution is simpler because of the greatly reduced access time. It may even be possible to edit in this manner from a single video disc by using a disc player with two heads. One plays a cut while the other searches for the next and it switches back and forth between the two. This is the basis for the Laser Edit system. With any of these systems a recording of the edited sequence can be made at any time by simply feeding the signal to a cassette recorder as it is played back.

Another hybrid solution to the problems of editing via re-recording is to record the cuts of the edited version on two or more cassettes in an A and B roll checkerboard fashion. What this permits is the recording of head and tail trim for each cut. When the sequence is played back, the cut from a scene on the A cassette to the next scene on the

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B cassette can be changed by altering the way in which the two machines are synchronized. While the A machine is playing, the B machine is advanced or retarded as required to permit the new cut. This makes it possible to assemble a sequence and then polish the pacing of it by adding or deleting frames on either side of each cut. The amount of head or tail trim available is limited by the length of the cuts and the number of cassettes used for recording. In most instances the pieces used are likely to be more than twice as long as the trims needed so two record machines would suffice. The editing system developed by CBS in its electronic cinematography project is based on this principle. (See "Single Camera Video Production—Part II: Kudzu & The CBS Electronic Cinematography System", in the July 1982 issue of American Cinematographer.) The EnVision system also uses this principle with the addition of a third cassette onto which new pieces can be re-recorded so that they can be inserted into a sequence after it has been assembled. If at some point in reviewing an edited sequence the editor decides he needs even more trim or a completely new shot, he simply records it onto this third cassette from the source material and the system revises the edit decision list accordingly.

Each of these basic approaches to the problem of re-cutting and polishing in video editing offers its own advantages. The more radical the departure from previously existing video editing techniques, the more expensive the system is likely to be, and a preference for one system over another is likely to be based on economic considerations as well as the editor's working method or style. The systems have very different solutions for the way in which the editor controls the machinery and accesses information about the material he is editing. Just as some film editors prefer working on an upright Moviola while others prefer a flatbed, each system will find its own proponents. There is one thing, however, that all the systems have in common and which is considered a pre-requisite for any "film style" video editing system. It is not necessary to look at time code numbers in order to edit pictures, and it is not necessary to use a large keyboard to control the machine. In the evolution of video editing equipment the increasing importance and complexity of the manipulation of time code numbers in the edit decision list had resulted in a working style which involved relating to a display of time code numbers on a screen which was often as prominent as the screen of the picture monitor on which the edited sequence was being displayed. Film editors who are accustomed to concentrating on the image and only occasionally checking a code number or key number on the edge of the film often find the display of time code numbers and the array of buttons on the keyboard for a sophisticated video editing system to be distracting if not intimidating. It is as though the technology is getting in the way of the creative process.

All the film style editing systems have simplified controls and use words or symbols as much as possible rather than numbers to present any information the editor may need in addition to the images and sounds he is editing. Some of the systems use graphics which are representations of an editing bench or a flatbed editor. They differ mostly in the degree to which they are modeled after or seek to emulate conventional film editing systems. The EnVision system, for instance, is directly modeled after a flatbed film editing setup and the primary display on its touch screen is a graphic representation of a 12 plate flatbed. The editor touches the representation of the picture or track module that he wants to lock or unlock and uses a shuttle knob modeled after the Showchron control to fast forward, play, rewind or stop the transports. The CBS system was based on the working procedures associated with editing on an upright Moviola. Its control screen employs graphics based on the layout of an editing bench and the assembly process calls for cassettes containing only one take each (comparable to a film roll for each take after the daily reel has been broken down).

On the other hand the Montage system represents an attempt to completely rethink the editing process and is conceptually modeled after computerized word processing. It makes no attempt to emulate the layout of a film editing setup, but has a logic of its own based on displaying the first and last frames of the pieces being used at any time. As a result it may take an editor a while to master the full capabilities of the system even though it is extremely simple and straightforward to use on one level.

The EditDroid system was obviously designed with conventional feature film procedures in mind and has provisions for computerized log sheets comparable to one an assistant editor would maintain on a large production. Here again the system is very simple to operate on one level, but might create an initial impression of complexity to those not totally familiar with cutting room procedures for a large feature. Much of the system is designed to permit integration of the editing process into the logistics of an entire production.

Of all the systems the Eeco Emme system is the closest to a conventional video editing system. It is, in fact, a system designed to be adaptable to different working methods by means of different types of controllers or "work stations." There is a simplified programmable keyboard which represents a refinement in the conventional approach to video editing and a "cinemagraphic" workstation involving a menu displayed on a small screen and a "mouse" control device for selecting options on the menu. The point of the cinemagraphic workstation is simply to make the video editing system as accessible as possible to editors with no prior experience editing videotape.

Most of these systems will be described in detail in separate articles in future issues of American Cinematographer. In the mean time readers desiring more information can contact the following:

EditDroid: The Droid Works, P.O. Box 2009, San Rafael, CA 94912 (415) 485-5000

Emme: Eeco Inc., P.O. Box 659, Santa Ana, CA 92702-0659 (714) 835-6000

EnVision: BHP Inc., Editing Systems Division, 1800 Winnemac Avenue, Chicago, IL 60640 (312) 989-2148

Laser Edit: Laser Edit Inc., 540 N. Hollywood Way, Burbank, CA 91505 (818) 842-0777

Montage: Montage Computer Corp., 52 Domino Drive, West Concord, MA 01742 (617) 371-0485 ■

Chris Gyoury

The Golden Gate Weave-free Telecine Gate

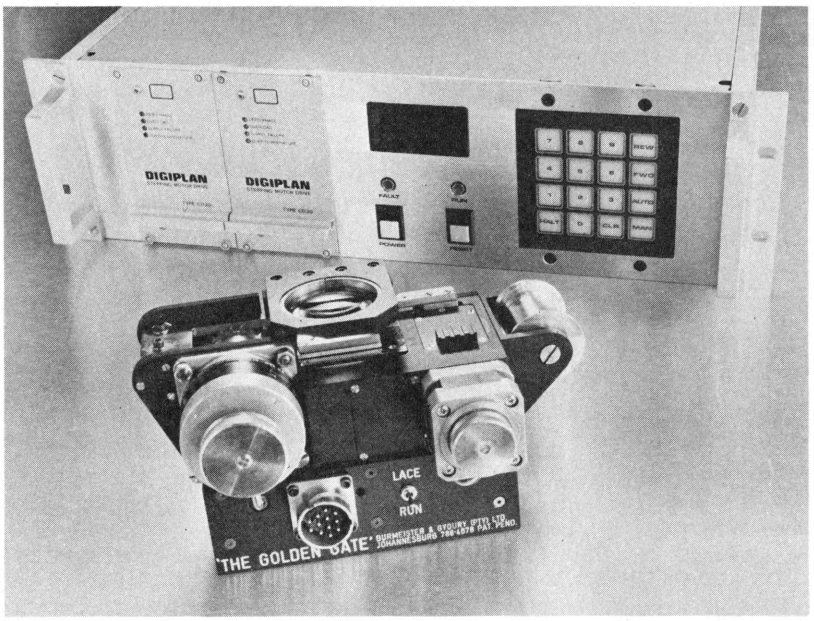
With the ever improving facilities and expanding creative possibilities in videotape post production, there seems to be a world wide swing towards the practice of originating material on film and post producing on videotape via the ubiquitous telecine. Nowhere is this more true than in the commercial side of the film business. And as a bonus to commercial producers the full gamut of tape effects—especially the more recently developed graphics and 'paintbox' type image manipulation processes—are easing their way into post production all around the world.

In the midst of the overwhelming pace of development in packaged electronic graphic effects today, which are being pushed forward on the leading edge of technology, there exists a basic mechanical anomaly which interferes with the marriage of film and tape and prevents it from reaching its full creative potential, the telecine weave.

Anyone who has watched an electronically generated title being superimposed on a film generated background will fully appreciate the completely unacceptable nature of the end result. Inevitably, the producer has to settle for a freeze frame solution which very likely does not fit in with his creative plans at all.

Like other film production companies, we at Burmeister & Gyoury have been perpetually frustrated by this simple technical shortcoming. We concluded that something should be done. With a background in engineering, I had always hoped to be able to cross fertilize my filmmaking endeavours with the engineering side of my training and for the last few years we, as a company, have been developing a seven axis motion control system for commercial and theatrical productions.

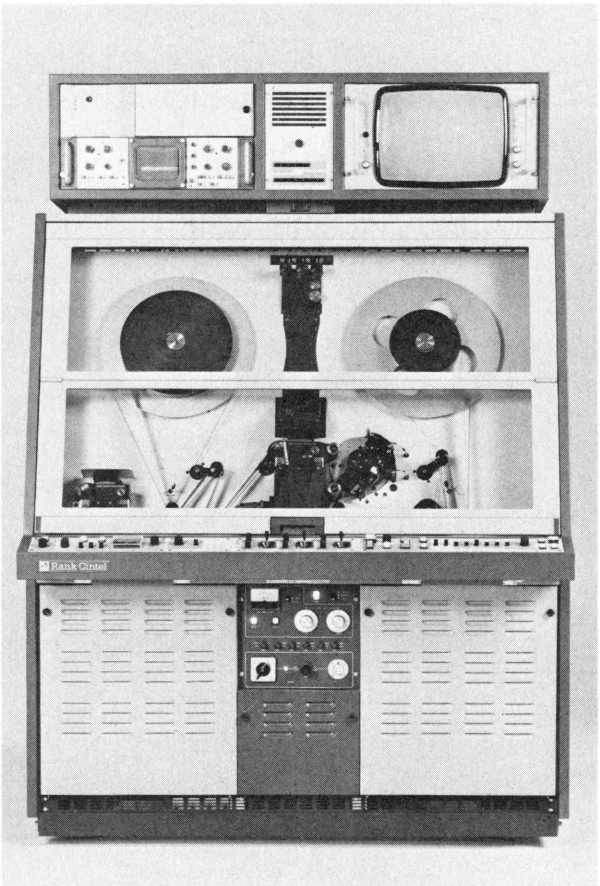
Resulting from this activity, our conventional film company personnel line-up of, producer, director, production department, editorial, etc., has been augmented by our very own engineering department. This is headed by Phil Kroll, an electronics engineer, with special aptitudes in computer design. Two more members—a model maker/mechanical engineer, Dennis Beechey, and a young industrial design graduate, Richard Wheeler, complete our team. In designing and building the motion control rig, we inevitably have become increasingly expert in robotics and this formed the basis of an interest in precision numerical control engineering, particularly as applied to the film industry.



The registration pin gate designed for the Rank Cintel and the micro-processor controlling the movement of the film and the stripper plate in the gate.

As the motion control project was nearing completion, I directed my attention to the design and construction of a new kind of telecine gate for use with the Rank Cintel Mark III. This was largely brought about by our greater involvement with special effects shooting and an anticipation that the motion control rig would be a more universal tool if the compositing of shots could be achieved on tape as well as film. First, we operate our production company in South Africa and here the advertising industry is rather small by world standards. As a result we have only one film processing laboratory in the country and every single foot of film generated here has to go through this one company. Whilst this is normally a workable situation, it means that the laboratory is structured as a quick-turn-around establishment which understandably has little room to include time consuming and highly complex optical processes in its already full repertoire.

The other consideration, born of local conditions, is unfortunately one of discipline on the client side. Local production time schedules have been collapsed in such a way that it has become quite normal to bid a job several weeks before a commitment is made and then have a completion schedule imposed upon us of sometimes as little as four or five weeks. These operating conditions are often regardless of the nature of the script and of course complex special effects shoots



The Rank Cintel Mark IIIC, the latest version of the telecine which many credit with revolutionizing film-to-tape transfer techniques.

and short pre- and post production schedules don't mix. Obviously, if we could find a way of developing a smoother videotape post production facility without creative and mechanical constraints we would be a long way towards presenting an irresistible sales proposition.

By collaborating in tests with Johannesburg's leading videotape facility company, Videolab, the B & G telecine gate project was able to go forward quite quickly. Videolab offered support and facilities. The completed gate is now in operation and offered to Videolab Clients as a house facility.

To begin with, only because of its newness, the gate is being used to fix up film sequences which have developed post production problems. It lends itself well to travelling matte generation and of course straight forward title and logo work becomes a joy. To date, we have evaluated the effectiveness of the gate by transferring 35mm film material shot on a register pin camera and by introducing a half wipe or luminance key, test patches from the edit suite have observed the relative weave. Of course, there is some movement—both vertical and horizontal, but to the eye, viewing a normal monitor from a normal viewing position, the movement is infinitesimal. In fact, the relative weave is very similar to that experienced with 35mm film mattes and super-impositions. In the course of our experiments, the revolutionary piece of equipment has become known as The Golden Gate.

At the time of writing, one prototype system exists. It is, however, expected that there will be a response to the new facility now available, which may well create the need for the design to be produced on a more commercial basis and in this regard Burmeister & Gyoury will investigate the feasibility of economic production.

The Rank Cintel Mark III flying spot telecine can be regarded as the state-of-the-art machine. Linked to one of the proprietary computerized grading systems, the producer can, by running negative, get as close as possible to the ultimately perfect film image on tape. As keen observers will know, the Mark III Cintel is a 'sprocketless' telecine which has, within the film path, one small sprocketed roller for encoding (electronically) the frame positions. Here, the movement of the film over the roller itself, turns a shaft which has a slotted encoding drum that interrupts fixed LED sensors. These signals, in turn, are used by the computer grading system to demarcate each frame of film so that frame accurate grading changes can be accomplished.

In the Rank Cintel III, the positioning of the film through, or over, the telecine gate is controlled by a capstan for the longitudinal axis and by a stationary ceramic cheek to arrest E–W drift. The edge of the film negative is in permanent contact with the guide and indeed a spring loaded roller is used to maintain it so. A 'steady image' captured on film enjoys a dimensional relationship with the sprocket holes, occupied by the camera's register pins during exposure. Obviously, the 'edge' of the negative material plays no direct part in spacially defining the photographic image. In order to 'replay' the negative with some measurable fidelity it is clear that the same sprocketed holes must be used to register the film in the telecine chain.

The above is all common knowledge, of course, but in order to enhance Rank's steadiness performance, it was necessary to design a self contained sprocket-hole-registering gate that went back to basic principles for its operation, but that allowed itself to be grafted, so to speak, upon the sophisticated workings of the Mark III Cintel. Clearly there is no available intermittent drive on the machine so we had to generate our own independent film advance and register pin system that could fit into the confined space available when the machine's standard gate was removed. It was decided to not resort to a mechanical intermittent motion, despite the fact that three existing, but different, register pin gates were offered up, namely: a standard Mitchell, a Bell & Howell and a Richardson gate.

In all cases, the mechanics of the gates got in the way of the light path of the telecine but in addition, the

gates were all opposite hand, so to speak, which would have made them unusable as the drive side could not be accommodated behind the front plate of the telecine. It became very clear, very quickly, that we had to start from scratch. However, the design factor inherent in the Bell & Howell gate that we did opt for, was the stationary pins method used superbly in the 2709 camera which has not been superceded for steadiness to this day. Here, unlike all other film cameras, where the register pins elegantly slide in and out of the stationary film, just after advance and just prior to advance the B & H shuttle gate mechanically lifts the film off the register pins, advances it one frame's length above them and then deposits the film back on the register pins for the exposure phase. Clearly this system reduces many of the errors of wear that can occur in mechanical devices and as contemporary design will bear out, this registration method has been universally adopted in modern animation cameras, where steadiness is of paramount importance.

The 'Golden Gate' has two motors. One is dedicated to advancing the film and the other's sole function is to raise and lower the stripper plate. These two functions are mutually related and of course lend themselves perfectly to micro-processor government. It is here that our experience derived from the building of the motion control rig, proved invaluable. We had developed a great respect for stepper motors and Phil had done a lot of work on motor drive amplifiers both off the shelf and home made. We opted for the off the shelf MDA's and chose the chopper drives by Digiplan. Unfortunately the smallest motor stepping solution is 1.8 degrees, which we considered quite coarse for the function required of it.

It was necessary therefore, to calculate a sprocket wheel design where the number of teeth and the diameter exactly resulted in a four sprocket increment (i.e. one frame) with a whole number of stepper increments, viz. 1.8° each. This resulted in a very bizarre diameter, utilizing 64 pulses and going to several decimal places, but which in practice has worked exactly. At this stage in the design we did not know whether the film advance motor

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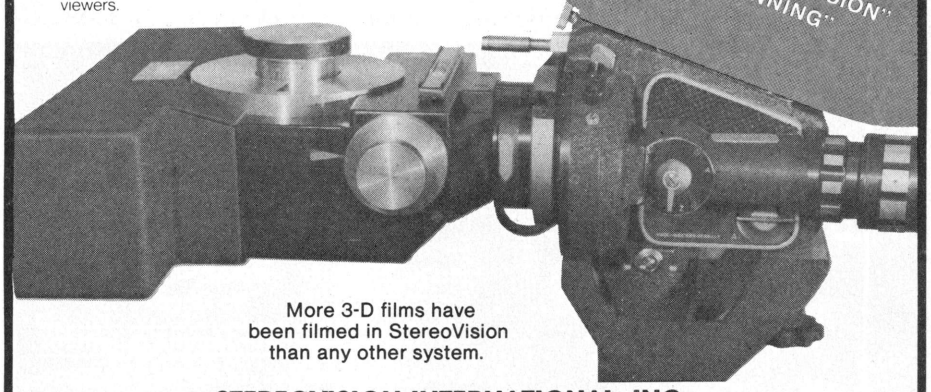

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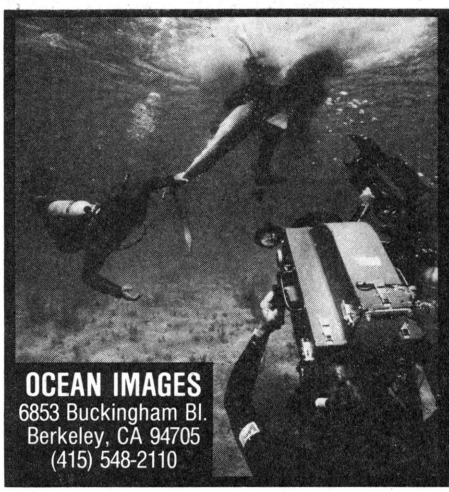

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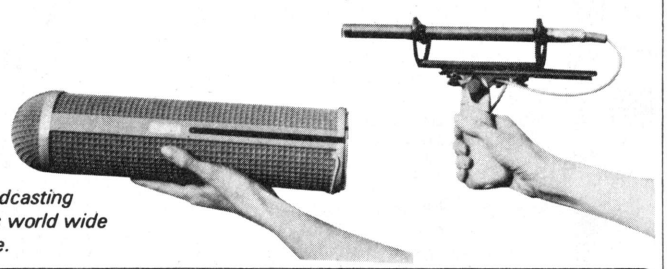

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would have to increment on an accumulative basis or whether each frame advance was an isolated electro-mechanical event. We were very apprehensive that if the microprocessor commands were accumulative, the system would attract an equally accumulative error, which clearly would render the idea useless.

Although, in practice, the film is advanced on an event by event basis, in tests we were astonished to find that the advance axis would be programmed to increment, say five hundred frames accumulatively and on completion the film (negative perfs) was still in perfect sprocket hole registration.

The film is laced in the telecine without passing around the capstan drive unit. Thus at rest the film is held stationary between the telecine spools by Rank's perfectly balanced and sensed torque motors. The gate advance motor simply increments the film with almost zero load and enjoys constant tension whether the spools are full or empty.

The stripper plate consists of a long film guide with upper and lower components. Pivoted at the far left of the gate the arc of travel of the stripping holes is shallow enough to be considered linear for all practical purposes. The top component pushes down the negative, whose holes are faithfully delivered vertically above the pins, until the spring-loaded frame pad sandwiches the negative against the stationary apperture plate. After the exposure phase the stripper plate arcs up and the lower component disengages the negative from the pins. At top dead center, so to speak, the advance motor ramps up and gently pushes the film onward for the next frame.

The optical system for the gate is identical to the standard gate. The lower lens group is housed in a phospor bronze barrel which has a rack and pinion focus system. To focus the gate, a small front cover plate is removed, revealing the focus lever. A tamper-proof socket head lock screw is released and the barrel can be raised and lowered while the telecine operator keeps both eyes on the monitor screen. The focus is then re-locked and remains so, despite repeated installing of the gate in and out. The upper condenser lens is held in a cantilevered bridge

which is not unlike the existing telecine gate.

To further aid stability we felt it necessary to be able to lock the gate in position on its two mounting rods. The existing gate is held with spring-loaded catches, but because of the inherent vibration of stepper motors, however small, we felt that an even more positive lock was called for. As a result, two chrome thumb wheels at the lower sides of the gate activate a pair of integral hinged clamps which can tighten the mounting rods.

The Golden Gate, when installed on the Rank Mark III, has an umbilical cord which is connected to a stand-alone micro-processor. This, as the photograph shows, is a standard 19 inch, 3U chassis and contains all the operating keys and indicators.

In turn, the micro-processor is connected via the edit desk to the video tape recorder. At present we have been recording using the assemble edit facility on a one inch 'C' machine, which has yielded perfectly satisfactory results, if a little heavy on tape wear! However, there has not been, to date, any visible sign of tape fatigue. With the advent of the new Delta one inch machine this year, however, the procedure for recording single frames becomes considerably simpler.

It should be pointed out at this stage that the 'Golden Gate' does not run or present continuous 'sound speed' pictures when recording. Being incremental in nature, the frames are presented at a much slower rate, largely because the video recorder has to rewind and stabilize before each frame is grabbed. The gate quickly but gently advances the next frame while the recorder is repositioning itself in order to write the next frame. It is a simple procedure to program the micro-processor to skip frames or double or triple print the negative, giving rise to a use for the Golden Gate akin to that of a laboratory optical step printer. Also the freeze frame facility is ideal because of the exact registration of the freeze, in the first generation.

In order to utilize computer grading, which of necessity requires rapid shuttling and constant viewing, the Golden Gate is set aside and replaced with the normal Rank gate. The negative is sight graded in the usual

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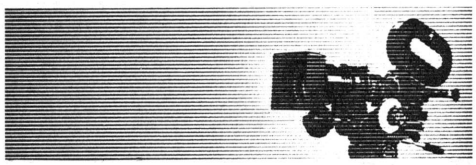

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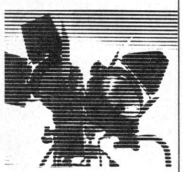

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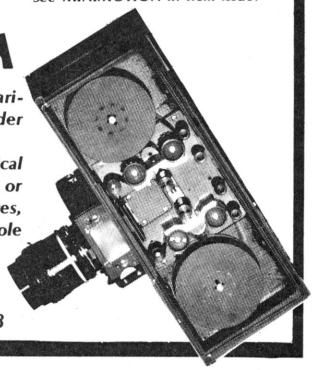

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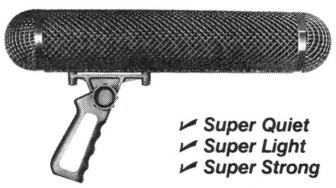

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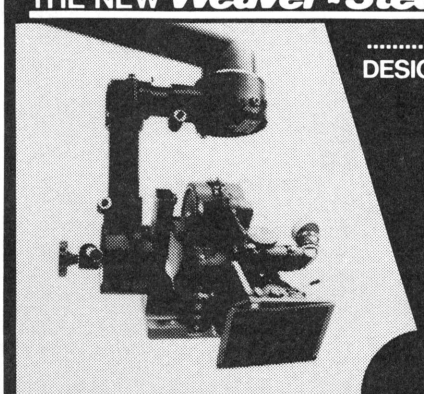

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way and all the frame related information gathered normally. The gates are exchanged and the sync positions replicated. The Golden Gate micro processor has an output port which can be interfaced with the computer grading system. This means that as the Golden Gate is being used it is supplying the same encoded frame information, as the Rank gate so that all previous grading is preserved, frame accurate.

The basic electronics are all housed in a standard 3U, rack mount card frame. The control electronics consist of the micro computer and support modules and are all based on the Euro-6 buss. The CPU card is designed around the 6809 micro-processor. The drive electronics are made up of two motor drive bi-polar amplifiers and associated power supplies.

The system as a whole can be considered a multiprocessor controller, in this case the host or principal controller being the 6809. The other two controllers which are also microprocessor based are considered the subordinate processors. The subordinate processors together with their interface electronics are known as the stepper motor controllers. These are responsible for all controls between the principal processor and the MDA's.

The electronics can be divided into five main parts: 1)The stand alone micro-computer complete with on board memory, buss buffering and parallel 1/0 ports for interfacing to the Rank Cintel's grading system and to the VTR edit command signal; 2) The axis controller cards with slave processors and interface adapters; 3) Display driver and keyboard encoder card; 4) Bi-Polar motor drive amplifiers; 5) The power /11, the power supply unit. This serves the processors and associated electronics and also supplies heavy current to the motor drive amplifiers.

The program controlling the gate mechanism is written in assembler language and is divided into four main program blocks. This block structure makes it easy to implement modifications to the program. The program blocks are: 1) Initialization and port configuration routines; 2) Data management; 3) Motion definition blocks; 4) Input, output handler routines.

The software is designed as a motion controller, governing the move-

ments of the two axes relative to each other. The program insures tight synchronization between the stripper plate movement (film registration) and the film advance axis. Due to this mechanical independence critical timing sequences have to insure that film handling is gentle and precise. These timings are software generated and have been trimmed for optimum overall performance.

The stepper motor controllers require data in ASCII form and can each store up to 48 bytes of predetermined motor parameters and motion definitions. The host processor will down load appropriate data to the controllers, final instruction being a 'wait' command. The controllers then remain in this wait state until the 'execute' command is received. The axis will then begin the execution of the previously loaded data. During execution the controllers indicate to the processor, a 'busy' condition, therefore insuring that the host cannot pass down any more data. When the motion is complete the controllers will interrupt the host processor, informing it that the axis is again ready for its next set of instructions.

These motion definitions, consisting of direction, angular displacement and speed parameters, are prepared from, (a) the 'default' or constants of the motor and mechanical characteristics; and (b) data, entered by the operator, defining the particular film requirements. These are evaluated and incorporated within the motion definitions.

The keyboard on the front panel is set up in the form of dedicated keys, each key having its own function. The function keys are: MAN: When this command is detected by the host the two motors will advance the next film frame into the gate. The frame counter will also be incremented.

2) AUTO: When this mode is selected the controller will be slaved to the video tape recorder. The CPU card has a dedicated port which is connected to the videotape machines TTL edit complete signal. On receipt of this flag, the processor will advance the next frame into the gate. The frame counter will be incremented and the processor will again poll the video interface for the next edit complete signal. Control is

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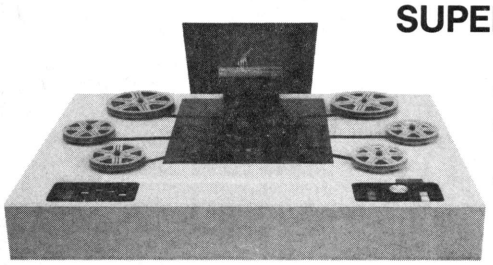

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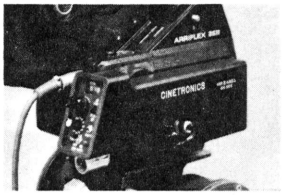

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returned to the keyboard when the selected number of frames have been recorded.

3) FWD: Film need not be unnecessarily subjected to passing through the gate and register pins when film shuttling is required. The processor will raise the stripper plate, releasing the film from the register pins, and then advance the film the required number of frames. At this point the film is replaced back onto the register pins.

4) REW: As in fast forward shuttle.

5) HALT: By depressing the halt key twice, all axis motions are temporarily suspended, but only once the frame being executed is complete.

6) CLR: This key will clear the keyboard buffer before the data can be transferred into processors memory.

7) 0–9 Numeric keypad to enter all frame data.

The single throw toggle switch located on the gate assembly will cause the motor holding torque to be removed. This will then allow the operator to manually rotate the motor shafts to their lace positions. When laced and the motors have been returned to their start marks, the operator will then toggle the switch back to the run position; the processor will acknowledge the request and reinstate the motor holding torques.

The frame counter will accommodate a full count of 999 frames. The count is absolute and always displays the current frame in the gate. As discussed the counter can be reset at any time. On initialization the processor will always set the counter at zero.

The 'Golden Gate,' although somewhat complex utilizes a very basic design in film handling to achieve a very vital result. The use of stepper motors and a processor contributes to reliability and although we have still only limited operating experience with the gate it has already proved invaluable on several occasions. The prototype gate will undergo some streamlining and rationalizing if it runs to a subsequent model or models but in essence the equipment is robust and efficient.

Users of the Rank Cintel Mark III flying spot interested should contact Chris Gyoury, 23 Sturdee Avenue, Rosebank, 2146, Johannesburg, South Africa. ■

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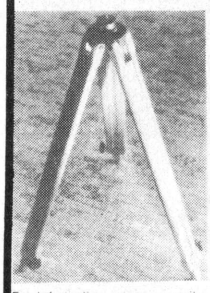

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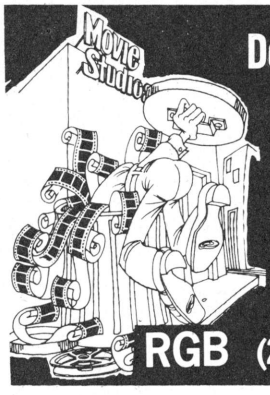

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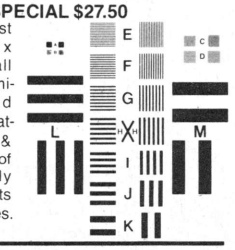

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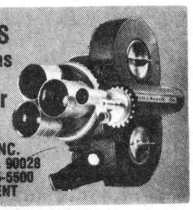

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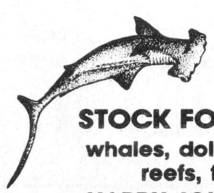

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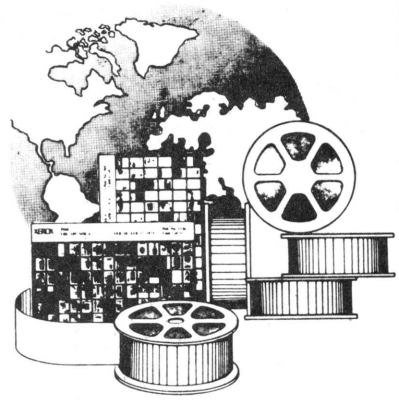

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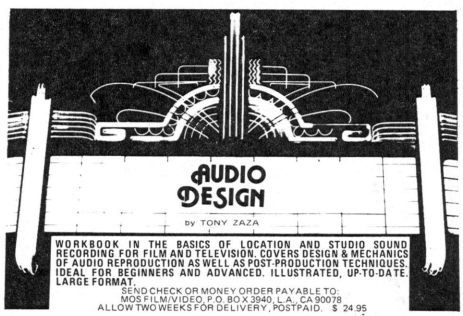

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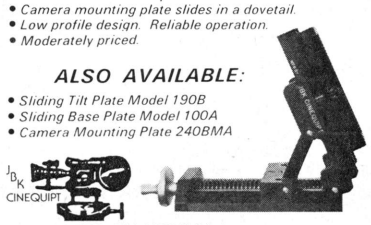

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In Memoriam

William Snyder, ASC, a musician who became a leading cinematographer almost by accident, died last March 4, it was learned recently. He was 83 and had been a member of the ASC since 1933.

Snyder came to Hollywood from New York for a vacation. A friend introduced him to John Arnold, ASC, head of the MGM camera department, who hired him as a camera loader. Although Snyder had never become familiar even with the workings of a box camera before, he became intensely interested in motion picture photography. Within a few years he was working as a second cameraman on such films as Tod Browning's *The Thirteenth Chair* (1929), filmed in both sound and silent versions, and *The Floradora Girl* (1930).

According to Snyder, most of his later success could be traced to the teachings of some of the cinematographers he assisted. To Oliver Marsh, ASC, he attributed his ability to photograph female stars with the accent on glamour; from Merritt Gerstad, ASC, he learned the art of dramatic effects photography; he gained a knowledge of photographic "style" from Victor Milner, ASC; and from Clyde DeVinna, ASC, whom he considered "the best photographer in the business," he learned "many important lighting secrets." As Snyder told *American Cinematographer* in 1949, "I simply combined the best ideas of these men with some of my own that I've developed over the years. I feel that the education I received working in the various studios and with most of the leaders in the profession is something I could not have acquired in any school or from reading books."

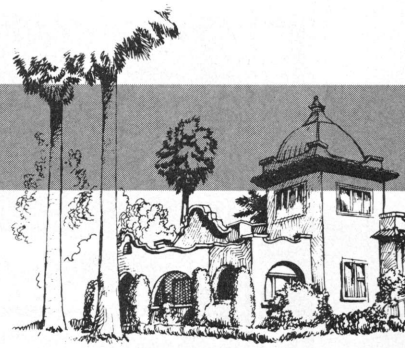
Snyder was with MGM for nine years, two of them as a special process cinematographer, followed by four years at Warner Brothers. For two years he shot documentary films for

Wilding Pictures. In 1940 he joined the Technicolor Company, where he quickly was recognized as an outstanding specialist in the art of color photography. During the next 10 years he worked on such outstanding Technicolor films as *Aloma of the South Seas* (1941), for which he received an Academy nomination; *White Savage* (1943), *The Princess and the Pirate* (1944), *The Bandit of Sherwood Forest* (1946), *Blue Skies* (1946), *The Swordsman* (1947), and *The Loves of Carmen* (1948). *Carmen* was a pure mood piece which proved a forerunner of many atmospheric color films to come much later. *The Man From Colorado* (1948) is another unusual film in which psychological drama was successfully melded to the Western genre.

Snyder said that his 10 years with Technicolor were the most enjoyable of his career, but he left to freelance and seek broader horizons. Working for all the major studios, he produced an enormous body of work. Among his many titles are *Flying Leathernecks* (1951), *Blackbeard the Pirate* (1952), *Creature From the Black Lagoon* (3-D, 1954), *The Conqueror* (1956), *Beyond a Reasonable Doubt* (1956) and a large number of Walt Disney theatrical productions and TV programs.

He retired in 1971 and lived in San Juan Capistrano. ■

From the Clubhouse



American Society of Cinematographers

The American Society of Cinematographers is not a labor union or a guild, but is an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as Directors of Photography and have demonstrated outstanding ability. Not all cinematographers can place the initials ASC *after their names.* ASC *membership has become one of the highest honors that can be bestowed upon a professional cinematographer, a mark of prestige and distinction.*

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Fourteen Society members who have been active in the A.S.C. for 50 years or more were honored at the November dinner meeting. Each was presented with a 50-year pin.

Included in this distinguished group are Lucien Ballard, Stanley Cortez, Floyd Crosby, Russell A. Cully, George Folsey, Henry Freulich, H.F. Koenekamp, Milton Krasner, Charles Lang, Harry Perry, Harold Rosson, Clifford Stine, Thomas Tutwiler, and Joseph A. Walker.

Lucien Ballard, an Oklahoma native, was nominated for an Academy Award for cinematography for *The Caretakers*. He also includes in his credits such memorable pictures as *Crime and Punishment* (1935) *Craig's Wife* (1936), *The Lodger* (1944), *Ride the High Country* (1962), *Son of Katie Elder* (1965), *The Wild Bunch* (1969) and *True Grit* (1969). There were many more. He also served on the Board of Governors for a time.

Cortez, currently vice president of the A.S.C., is also a member of the publications committee, TV research committee and the entertainment committee. He was nominated for an Oscar twice: once for his cinematography of *The Magnificent Ambersons* (1942) and *Since You Went Away* (1944). Cortez served in the Signal Corps during World War II, speaks six languages fluently and is the author of a booklet describing the organization and purposes of the A.S.C. Also among his credits are *The Black Cat* (1941), *The Man on the Eiffel Tower* (1949), *Night of the Hunter* (1955), *Three Faces of Eve* (1957) and *The Bridge at Remagen* (1969).

Floyd Crosby, a member since 1934, was awarded an Oscar for cinematography for *Tabu* (1931). Over the years, his remarkable credits include *The River* (1937), *The Brave Bulls* (1951), *High Noon* (1952) and *The Wonderful Country* (1959). Crosby also photographed the famous Edgar Allan Poe series including *House of Usher* (1960) through *Comedy of Terrors* (1964).

Russell A. Cully is a pioneer in special photographic effects, starting his career at Paramount-Famous Players-Lasky, where from 1923 to 1933, he worked on miniatures, glass shots, optical printing, and montages. He also directed second units, chase scenes, etc. Later in his career he worked at MGM, followed by a long term at RKO Radio.

George Folsey, president of A.S.C. in 1956–57, serves on the Board of Governors. In 1957 he received the George Eastman House "George" award. He developed a technique for using reflective and diffused light. In 1981 the Academy Foundation honored him with "A Salute to George Folsey." He was nominated for an Oscar on 16 separate occasions, including for *Royal Family, Meet Me in St. Louis, White Cliffs of Dover, The Gorgeous Hussy* and *The Balcony.*

Henry Freulich, now serving on the Board of Governors and chairman of the health and welfare committee, was a captain in the Marine Corps during World War II, He became an A.S.C. member in 1933 and was with Columbia studios during the 1930s and 40s, shooting hundreds of mystery and action pictures such as the *Boston Blackie* and *Lone Wolf* series.

H.F. Koenekamp, an Iowa native, became a member in 1921. He began as a cameraman for Mack Sennett in 1913, worked for Vitagraph for eight years filming comedies, then for First National doing production photography. He later specialized as a second unit director and cameraman in the special effects field. Included in his credits are such motion pictures as *Moby Dick, Noah's Ark, Air Force, Spirit of St.*

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Louis, and *Treasure of the Sierra Madre.* He perfected a synchronized motor for connecting background projectors with a camera.

Milton Krasner, a member of the Board of Governors, is 3rd vice president, serving as chairman of the editorial committee. Krasner was given Academy Awards for *Three Coins in the Fountain* and *An Affair to Remember.* He was nominated for awards for *Arabian Nights, How the West Was Won, Love With the Proper Stranger,* and *Fate is the Hunter.* These are only a small fraction of the hundreds of motion pictures he photographed during his career.

In 1927 Charles Lang became a member of the A.S.C. He served on the Board of Governors for a time. He won an Oscar for *A Farewell to Arms* and was nominated for Academy Awards 16 times. Others of his films include *The Right to Love, The Cat and the Canary, Sundown, The Uninvited, Sabrina, Some Like it Hot, One-Eyed Jacks* and *Butterflies are Free.*

Harry Perry, who became a member in 1922, was nominated for an Oscar for his work on *Hell's Angels.* He is famous for his aerial photography on that picture as well as *Wings, The Broken Wing* and *Flying Devils.* Perry also was a pioneer special effects cameraman for Universal silent pictures.

Harold Rosson, formerly a member of the board of Governors, earned his first film credit in 1915 for *David Harum.* He was nominated for Oscars for *The Bad Seed, Boom Town, 30 Seconds Over Tokyo* and *The Asphalt Jungle.* He worked on many films in England for Alexander Korda including *The Scarlet Pimpernel* and *The Man Who Could Work Miracles.* He was given the first Oscar ever awarded for color cinematography for *The Garden of Allah.*

Clifford Stine, a former Board member, is well remembered for his work as a director of photography and a special effects DP. Among his credits are *King Kong* (1933), *The Land Unknown, Tarantula, This Island Earth, Earthquake* and others.

Thomas Tutwiler, a native Texan, worked in the special effects photography department at MGM for 15 years. He was a captain in the Air Force during World War II, working as an aerial photographer and a ground combat photographer as well. Tutwiler shot the aerial photos of two South Pacific atomic tests (Crossroads Pacific.) He later shot aerials for *Blaze of Noon, Bridges at Toko-Ri, Strategic Air Command, Spirit of St. Louis* and *Hunters*, among others.

Joseph Walker, whose Hollywood memoirs have just been published in a book called "The Light on Her Face," is the first cinematographer to receive the Gordon E. Sawyer award for his invention of the zoom lens. As a director of photography, he was nominated for his work on *You Can't Take It With You* and *Here Comes Mr. Jordan.* He spent a major part of his career as director of photography on classic Frank Capra pictures, including *It Happened One Night* and *Lost Horizon.*

The Society of Motion Picture & Television Engineers honored Linwood Dunn, ASC, with honorary membership at an annual honors and awards luncheon in New York recently.

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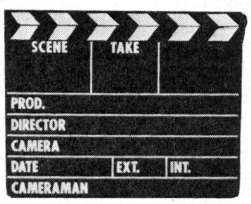

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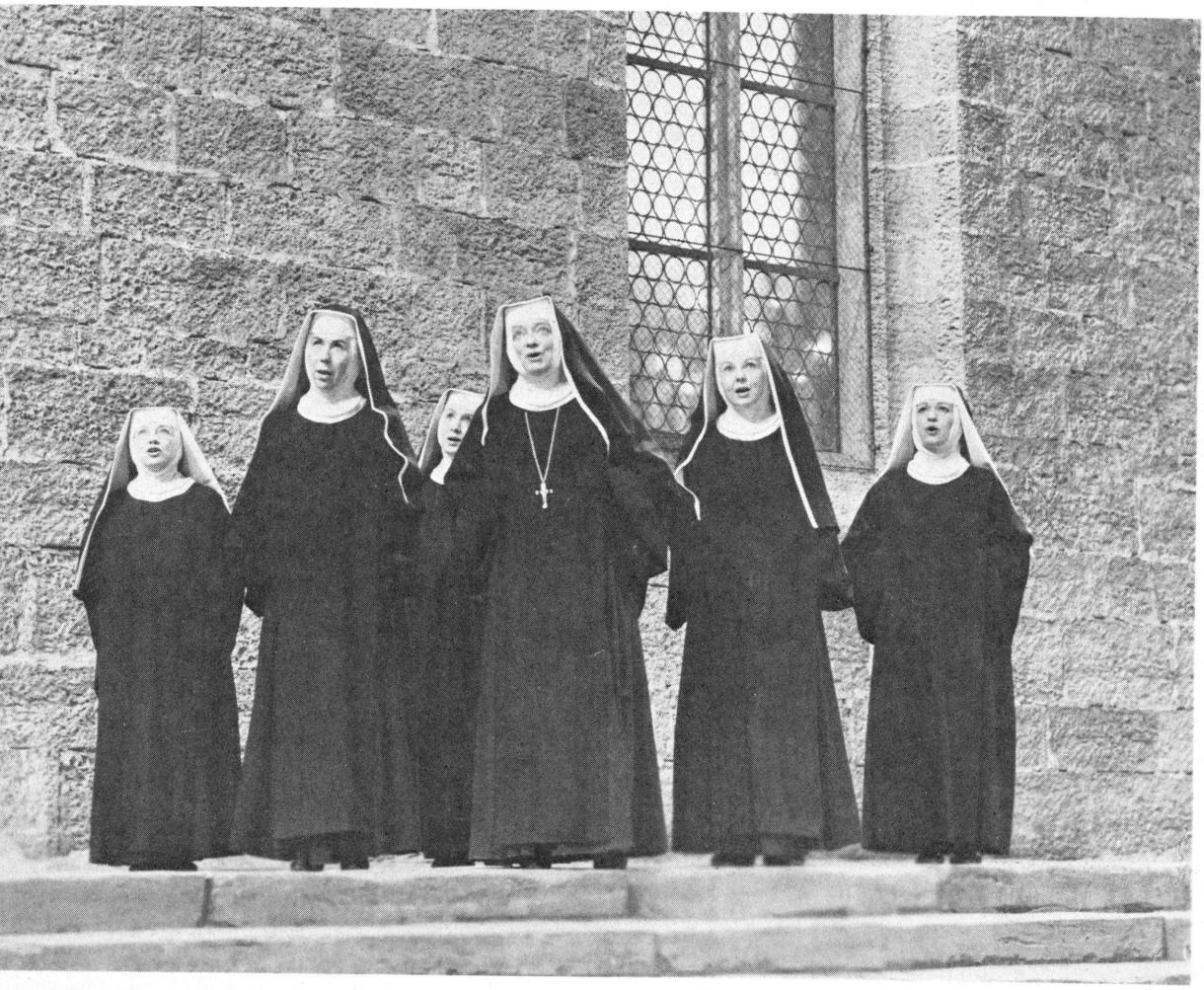
***Richard L. Rawlings, ASC, came to hollywood from Anderson, Indiana, and worked in various jobs for Warner Bros. for nine years before becoming an assistant cameraman for James Wong Howe, ASC, in 1943. He became a director of photography at Ziv-TV, where he shot many episodes of* Highway Patrol, The Sea Hunt *and other early TV shows. He was a nominee for an Emmy this year for his work on* Dynasty. *Other shows include* The Wild, Wild West, Alfred Hitchcock Presents, The Name of the Game, *and* Charlie's Angels.



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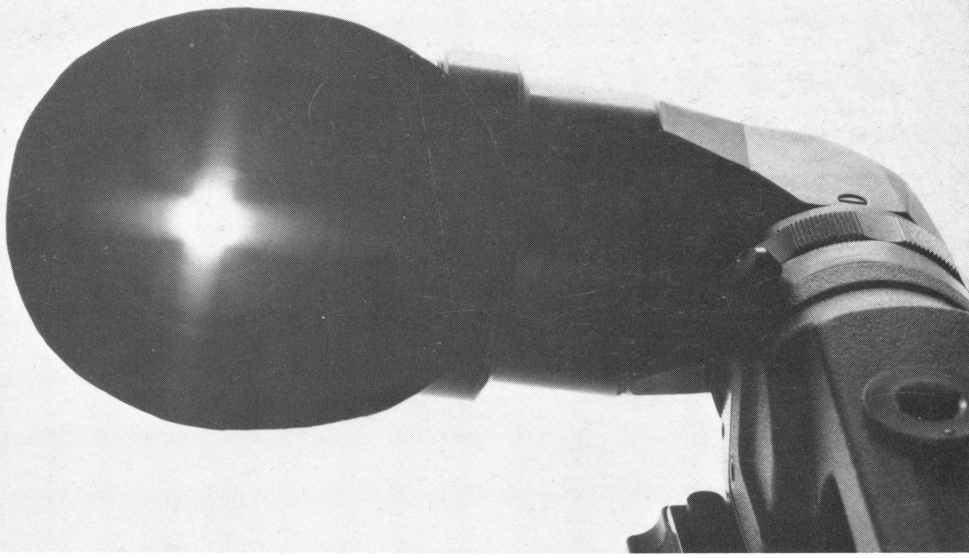
"THE AATON LTR HAS THE BRIGHTEST VIEWFINDER OF ANY 16 OR 35MM CAMERA THAT I'VE PUT MY EYE TO." ED LACHMAN.



Acclaimed cinematographer Ed Lachman has looked through many viewfinders—for Werner Herzog, Wim Wenders and now for his latest work on the feature, "Stripper." He knows what he wants when he sights through the eyepiece.

That's why he didn't waste time over his camera choice for "Stripper." For Ed, only the Aaton LTR would do, and the high definition viewing screen was a key reason.

A CURVED LENS FOR A SHARPER IMAGE

Aaton's fiber optic technology and concave viewing screen produce one of the brightest images in filmmaking. "The magnification is superb, and the markings are clear and precise," Ed notes. "You can see around the entire frame without aberrations or visual clutter."

16MM FLEXIBILITY WITH 35MM QUALITY

The viewfinder was only one of the reasons Ed picked Aaton. He knew the LTR 54 was the first camera with Super 16 built in—not added on. It weighs only 13 pounds, giving you extraordinary mobility. Plus, the image can be blown up to high grade 35mm with possible cost savings of 75% on raw stock and 50% in post-production.

CREATIVITY WITH CLEAR TIME

Aaton Clear Time Recording (CTR), an SMPTE time code system, electronically synchronizes image to audio. Simply punch production information into the LTR and audio recorder at the beginning of each day. Then concentrate on cinematography, not slating. CTR makes life easier in post-production because you can read the information right off the fullcoat.

STUDIO VERSATILITY

Aaton's 20cm eyepiece extender, which locks easily onto the viewfinder, helps you make the difficult shots. In tight places, around corners. "The extender really increases production capability," Ed says, "and keeps the image sharp."

AATON SUPER 16...
ALL YOU NEED TO ADD IS IMAGINATION.

Zellan Enterprises Ltd.

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